MONROE TOWNSHIP MUNICIPAL WELLS #4 & #5
#4 - WASHINGTON AVENUE & BLACK HORSE PIKE
#5 - CHESTNUT & WATER STREET
MONROE TOWNSHIP, GLOUCESTER COUNTY
NEW JERSEY
EPA ID# NJD980769699

GENERAL INFORMATION AND SITE HISTORY

The Monroe Township Municipal Wells (MTMW) #4 & #5 are located on two separate parcels of land in Williamstown, Monroe Township, Gloucester County. This area of Monroe Township is considered residential, with an average of 550 people per square mile. These wells are owned by the Township of Monroe and are operated by the Monroe Township Municipal Utilities Authority (MUA). Well #4 was installed on November 15, 1951 and Well #5 on February 4, 1967. These wells were utilized quite extensively until a mercury contamination problem was discovered on June 21, 1976. Well #4 is currently retained only for emergency purposes, while #5 is still on-line.

SITE OPERATIONS CONCERN

The MTMW's #4, #5 and #6 were utilized as the main production wells for the public water supply system of Monroe Township. In 1976, a state instituted program for sampling raw water sources throughout the state had disclosed an inorganic mercury contamination as high as 6.4 PPB in Well #4. Wells #4 and #5 are located respectively on Washington Avenue and Chestnut Streets, with an intervening distance of 1200 feet. At that time, only three wells (#4, #5 & #6) supplied all the potable water for the system. And, the New Jersey Potable Water Standards did not include a maximum contaminant level for mercury, however, a "rule of thumb" maximum of 2.0 PPB was recognized. The National Interim Primary Drinking Water Regulations became effective June 1977 which implemented 2.0 PPB as the maximum contaminant level for mercury. An inspection of the Monroe Township MUA system was conducted on October 5, 1976 but no determination could be made for an immediate source of the mercury. The mercury found in the ground water was in the inorganic form which is slightly less toxic than the alkyl (organic) form. In 1976, sample collection and analysis of ground water from Wells #4 and #5 revealed a maximum mercury content of 6.4 and 2.8 PPB respectively. Also, at that time, system samples revealed mercury values as high as 10.8 PPB. Since then, the levels of mercury have steadily dropped to within the limits of acceptability for potable water. A 1986 analysis of a private potable well at the limit of the MUA water supply system revealed total mercury as high as 3.6 PPB.

The NJDEP/Bureau of Planning and Assessment prepared a preliminary assessment on April 14, 1987 which designated this site a medium priority in need of further investigation. This report revealed several probable sources of the contamination, however, an inactive gravel pit is recognized as the most likely candidate as the source of the mercury contamination. This parcel of land is approximately 10.24 acres and is located adjacent to Clayton Road, upgradient of MTMW's #4 and #5. The pit itself had unauthorized dumping of assorted solid waste over many years. A large

portion of the gravel pit is devoid of vegetation, and is currently used by the neighbors for recreational "all-terrain-vehicles." The solid waste is mostly concrete, asphalt, soil, landscape debris and household trash.

GROUND WATER ROUTE

The MTMW site is situated approximately 2000 feet above the Raritan Formation, the bedrock and the parent material of the overlying formations. Starting at the surface, the soil is characterized by Downer Sandy Loam (DsA) and Aura-Sassafras Sandy Loam (AuB) for Well #4 and Well #5 locations respectively. Both of these soils are well drained and have a slope of less than five percent. These soils are characteristic of the Quarternary Bridgeton Formation and extend to a depth of approximately 17 feet. The static ground water level encountered in this area is approximately 12 feet deep and extends into the Cohansey Formation below.

The Cohansey Formation is a major water bearing unit with a total thickness of approximately 100 to 250 feet deep. Locally, there may be more than one water bearing zone present with several clay beds and semiconfined conditions existing, however, the formation is generally regarded as a hydrologic unit. Underlying the Cohansey Sand is the Kirkwood Formation which is a minor aquifer and hydraulically connected to the above formation.

There is only one monitoring well for observing ground water quality in this area. This well is located approximately 0.6 miles southeast of Well #4 on Avery Drive (Newberry Farms) which is screened in the Cohansey Sand Formation with a total depth of 120 feet. The sampling and analysis of this well over time has never resulted in elevated levels of mercury which exceeded the drinking water standards.

The population presently served by ground water is approximately 28,000 people, of which 18,240 people are on public water supply and 9760 people are on private wells. Currently there are four public wells (#4, #5, #6 & #7) which are operated by the MUA. At present, Well #4 is retained only for emergency situations due to elevated levels of mercury detected in the past. The private potable wells and the public supply wells are all screened in the Cohansey Formation. A July 17, 1986 sampling and analysis of a private potable well by the Gloucester County Health Department revealed a mercury contamination of 3.6 PPB. This well is located 0.75 miles West of Well #4, and is hydraulically upgradient of that well. A potential exists for population exposure/injury through mercury contamination of potable wells in this area.

SURFACE WATER ROUTE

There are several surface water routes within a four mile radius of MTMW's #4 and #5. The closest downslope surface water is the Squankum Branch of the Great Egg Harbor River. This surface water is located approximately 0.10 miles from Well #4 and continues in a southeasterly direction toward the Great Egg Harbor River. The Hospitality Branch of the Great Egg Harbor River has its headwaters located 1.3 miles southwest of Well #4. And, the Four Mile Branch of the Great Egg Harbor River is 1.5 miles North of Well #4. There have not been any sampling of these surface waters to document

if contamination has occurred. The potential for surface water contamination via runoff, does not exist. Additionally, the subsurface location of the mercury contaminated ground water precludes the possibility of the contaminants entering the surface water.

The primary use of these surface waters are for recreation. There are no known surface water intakes for potable use or irrigation within the area.

There are several sensitive areas located within the vicinity of the site. Approximately 0.8 miles southeast of Well #4 is a federally designated freshwater wetland. This area is also suspected habitat for the endangered Bog Turtle (Clemmys muhlenbergi) which has precise semiaquatic requirements for this species to survive.

AIR ROUTE

The subsurface location of mercury contaminated ground water precludes any potential for air contamination. In addition, there has not been any air sampling conducted in relation to this site.

SOIL

The Monroe Township Municipal Well site is a confirmed ground water contamination problem. The source of the contamination has not been identified at present, however, it is reasonable to assume that a potential for soil contamination does exist at the source and throughout the Cohansey Sand Formation within the region of the mercury contaminated plume. There has not been any soil sampling conducted in relation to this site, thus qualitative evidence for soil contamination does not exist. A 10.24 acre abandoned gravel pit located off Clayton Road is suspected of being the source of the ground water contamination.

DIRECT CONTACT

The potential for direct contact with the mercury contaminated ground water does not exist due to its subsurface location. The source of the contamination, once identified, may provide a potential pathway for direct contact and population exposure or injury.

FIRE AND EXPLOSION

The potential for fire and explosion at the Monroe Township Municipal Wells do not exist. The subsurface location and the waste characteristics of inorganic mercury precludes this possibility.

ADDITIONAL CONSIDERATIONS

The subsurface location of the mercury contaminated ground water precludes the potential for damage to flora and fauna. Mercury is a lipophilic compound which has the waste charateristics to contaminate the food chain, however, this is not considered possible due to its environmental inaccessibility. An additional consideration of importance is the potential damage to off-site property. The 1986 discovery of 3.8 PPB mercury in a potable well at a Williamstown High School Building may be evidence of damage to offsite property through contamination of this potable well.

ENFORCEMENT ACTIONS

On November 3, 1976 the NJDEP/Bureau of Flood Plain Management Element advised the MUA to immediately undertake the construction of new wells to replace Wells #4 and #5 and, in the interim, use Well #6 as the main production well, augmented as necessary by Well #5 to meet daily water demands. It was also suggested that Well #4 be taken out of service and retained only for standby purposes to meet a dire emergency such as a major fire. Additionally, an inspection of the Monroe Township MUA system was conducted on October 5, 1976, however, no determination could be made for any probable source of the mercury contamination. A total of 24 public water supply wells in the area surrounding Monroe Township were sampled, all with negative results for mercury. On July 17, 1986 the Gloucester County Health Department conducted an investigation into the mercury contamination of a potable well. Subsequent sampling and analysis revealed 3.6 PPB mercury in this well. The County recommended the use of bottled water until a permanent alternate supply can be provided. A preliminary assessment was conducted by the NJDEP/Bureau of Planning and Assessment on April 14, 1987. This investigation has designated this a medium priority site with a potential for population exposure/injury through the use of the residential potable wells.

PRIORITY DESIGNATION

This site is designated a medium priority site due to the confirmed ground water contamination that currently exists. Since no remediation has occurred, a potential exists for population eposure/injury through potable well contamination.

SUMMARY OF SAMPLING DATA

1.

A.	Sampling date:	6/21/76
B.	Sampled by:	NJDEP
C.	Samples:	3 - public supply wells (4,5 & 6)
D.	Laboratory:	NJDEP
E.	Parameters:	Potable water standards and heavy metals.
F.	Sample description:	3 - aqueous samples of ground water
G.	Contaminants detected:	Inorganic mercury
H.	QA/QC:	There were no samples collected and analyzed for QA/QC results. The laboratory that did the analysis was a state organization. It is not known whether a Chain of Custody was implemented. A formal NJDEP QA review was not conducted for this sampling episode.
I.	File locations:	Gloucester County Health Department

2.

A.	Sampling date:	7/19/76
B.	Sampled by:	NJDEP
C.	Samples:	2 - public supply wells (4 & 5)
D.	Laboratory:	NJDEP
E.	Parameters:	Potable Water Standards and heavy metals
F.	Sample description:	2 - aqueous samples of ground water
G.	Contaminants detected:	Inorganic mercury
H.	QA/QC:	There were no samples collected and analyzed for QA/QC results. The laboratory that did the analysis was a state organization. It is not known whether a Chain of Custody was implemented. A formal NJDEP QA review was not conducted for this sampling episode.
I.	File location:	Gloucester County Health Department

3.

A.	Sampling date:	8/18/76
B.	Sampled by:	NJDEP
C.	Samples:	2 - public supply wells (#4 & #5) 1 - public supply system
D.	Laboratory:	NJDEP
E.	Parameters:	Potable Water Standards and heavy metals.
F.	Sample description:	3 aqueous samples
G.	Contaminants detected:	Inorganic mercury
H.	QA/QC:	There were no samples collected and analyzed for QA/QC results. The laboratory that did the analysis was a state organization. It is not known whether a Chain of Custody was implemented. A formal NJDEP QA review was not conducted for this sampling episode.
I.	File locations:	Gloucester County Health Department

4.

A.	Sampling date:	1/29/88
B.	Sampled by:	P & P Laboratories, Inc.
C.	Samples:	4 - public supply wells 1 - monitoring well
D.	Laboratory:	P & P Laboratories, Inc., Woodlynne, New Jersey
E.	Parameters:	Mercury
F.	Sample description:	5 - aqueous samples of ground water
G.	Contaminants detected:	None
H.	QA/QC:	Neither trip blank, field blank, or duplicate was collected and analyzed for QA/QC results. This laboratory was certified for metals and inorganics at the time of this analysis. A formal Chain of Custody was not implemented from the time of sample collection until the analysis was performed. A formal NJDEP QA review was not conducted for the sampling episode.
I.	File locations:	Gloucester County Health Department Monroe Township Municipal Utilities Authority.

RECOMMENDATIONS

The Monroe Township Municipal Well contamination by inorganic mercury no longer exists. The elevated levels of mercury which exceeded the federal drinking water standards have decreased over time and are now within the acceptable limits for potable water.

The 1986 discovery of inorganic mercury in a residential potable well may be evidence that the contaminated ground water plume has migrated. A referral will be made through the DWR/Bureau of Safe Drinking Water to the Southern Bureau of Regional Enforcement to determine the vertical and horizontal extent of the ground water contamination in this area. This Bureau will also conduct an investigation of the area to assess probable sources of the mercury contamination.

Hours Worked: 85

Submitted by:

Frank Faranca

Frank Faranca, HSMS IV
NJDEP/DHWM/BPA

Site Inspection Report

MONROE TOWNSHIP MUNICIPAL WELLS #4 & #5
#4 - Washington Avenue & Black Horse Pike
#5 - Chestnut & Water Street
Monroe Township / Gloucester County
New Jersey
EPA ID# NJD980769699

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D980769699

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Monroe Twp. Municipal Wells #4 & #5	Washington Avenue; Chestnut Street

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Monroe Township	NJ	08094	Gloucester		

09 COORDINATES LATITUDE	LONGITUDE	10 TYPE OF OWNERSHIP (Check one)
39 41 03	74 59 25	☐ A. PRIVATE ☐ B. FEDERAL ☐ C. STATE ☐ D. COUNTY ☒ E. MUNICIPAL ☐ F. OTHER ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
MONTH DAY YEAR	☒ ACTIVE ☐ INACTIVE	11/15/51 (BEGINNING YEAR) Present (ENDING YEAR) ☐ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)

☐ A. EPA ☐ B. EPA CONTRACTOR _____ (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR _____ (Name of firm)

☒ E. STATE ☐ F. STATE CONTRACTOR _____ (Name of firm) ☐ G. OTHER _____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Site Inspection Review			( )

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
			( )
			( )
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
			( )
			( )
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☐ PERMISSION ☐ WARRANT		

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
George Cassabone, Superintendent	Monroe Twp. MUA	(609) 629-7586

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Frank Faranca, HSMS III	NJDEP	DHWM/BPA	(609) 292-1418	04 15 88 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D980769699

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES *(Check all that apply)*

☐ A. SOLID ☐ E. SLURRY
☐ B. POWDER, FINES ☐ F. LIQUID
☐ C. SLUDGE ☐ G. GAS
☐ D. OTHER _____ *(Specify)*

02 WASTE QUANTITY AT SITE *(Measures of waste quantities must be independent)*

TONS _____
CUBIC YARDS _____
NO. OF DRUMS Unknown

03 WASTE CHARACTERISTICS *(Check all that apply)*

☐ A. TOXIC ☐ E. SOLUBLE ☐ I. HIGHLY VOLATILE
☐ B. CORROSIVE ☐ F. INFECTIOUS ☐ J. EXPLOSIVE
☐ C. RADIOACTIVE ☐ G. FLAMMABLE ☐ K. REACTIVE
☐ D. PERSISTENT ☐ H. IGNITABLE ☐ L. INCOMPATIBLE
☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			A state instituted program for
OLW	OILY WASTE			sampling raw water sources
SOL	SOLVENTS			detected a mercury contamination
PSD	PESTICIDES			in wells #4 & 5. These wells
OCC	OTHER ORGANIC CHEMICALS			are owned and operated by
IOC	INORGANIC CHEMICALS			Monroe Township M.U.A.
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	Unknown		

IV. HAZARDOUS SUBSTANCES *(See Appendix for most frequently cited CAS Numbers)*

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
MES	Mercury	7439-97-6	System sample	10.8	ppb

V. FEEDSTOCKS *(See Appendix for CAS Numbers)*

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

Attachment B4 Mercury Contamination Summary

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
N.J	D980769699

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [X] A. GROUNDWATER CONTAMINATION — 02 [X] OBSERVED (DATE: 6/31/76) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

A state program for sampling raw water sources revealed a mercury contamination problem in excess of the National Safe Drinking Water Standards. Well sample analysis revealed mercury as high as 6.4 ppb in well #4 and 2.8 ppb in well #5. (Att. B4)

01 ☐ B. SURFACE WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

The Squankum Branch of the Great Egg Harbor River is located .10 miles from well #4. The subsurface location of the mercury contaminated groundwater precludes the possibility of surface water contamination. (Att. 1 & 2)

01 ☐ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

The subsurface location of the contaminants precludes the possibility of air contamination.

01 ☐ D. FIRE EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

The waste characteristics of inorganic mercury does not include any potential for fire or explosion.

01 ☐ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

The potential for direct contact does not exist due to the subsurface location of the mercury.

01 [X] F. CONTAMINATION OF SOIL — 02 ☐ OBSERVED (DATE: _____) [X] POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: _____ (Acres) 04 NARRATIVE DESCRIPTION

The observation of mercury in public and private wells within Monroe Township may be the result of surface soil contamination.

01 [X] G. DRINKING WATER CONTAMINATION — 02 [X] OBSERVED (DATE: 6/21/76) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

The levels of mercury found in wells #4 & 5 have decreased since its discovery, however, additional residential potable wells may be in danger of contamination through migration of this plume. (Att. A, B)

01 ☐ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

The potential for worker exposure/injury does not exist. The levels of mercury within wells #4 & 5 have decreased to acceptable tolerances, precluding the possibility of MUA employee exposure. (Att. A)

01 [X] I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: _____) [X] POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 9800 04 NARRATIVE DESCRIPTION

The current population of Monroe Township is approximately 28,000 people, of which 9800 people (35%) are not on public water supply and may be potentially at risk.

(Att. G)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NJ	D980759699

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
The potential for damage to flora does not exist due to the subsurface location of the contaminants.

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)
The Squankum and Hospitality Branch of the Great Egg Harbor River are confirmed waterways supporting anadromous herring species, however, the subsurface location of the contaminants precludes the possibility of damage to the aquatic and terrestrial fauna. (Att. H)

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
Mercury is a lipophilic compound which has the potential to contaminate the food chain, however, the location of the contaminants precludes this possibility.

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids, Leaking drums) — 02 ☒ OBSERVED (DATE: 6/21/76) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 8200
04 NARRATIVE DESCRIPTION
An unknown source of mercury waste has contaminated the groundwater in Monroe Township. (Att. B)

01 ☒ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
The 1986 discovery of 3.8 ppb mercury in a potable well at Williamstown High School may be evidence of damage to offsite property through potable well contamination. (Att. B)

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
The sampling and analysis of standing water in a storm sewer culvert which accepts well #4 overflow revealed mercury at levels below detectable limits. (Att. B30)

01 ☒ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
A potential exists for the illegal/unauthorized dumping of waste to be contributing to the groundwater contamination.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS
Approximately 9760 people are not hooked up to the Municipal Water Supply and are at risk of being exposed to the contaminated groundwater through the use of their domestic wells.

III. TOTAL POPULATION POTENTIALLY AFFECTED: 9760

IV. COMMENTS

A referral will be sent to Southern Regional Enforcement through the Bureau of Safe Drinking Water to determine the extent of groundwater contamination in residential potable wells.

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Attachment 1: USGS Topographic Map
2: State Atlas Map
A: Monroe MUA - Water Potability Analysis
B: Site History 6/21/76 to 9/3/86
G: Memo to File
H: Technical Manual for Stream Enforcement

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D980769699

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES				
☐ B. UIC				
☐ C. AIR				
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify) Well #4	31-361	11/15/51	None	Emergency use only
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify) Well #5	31-5035	2/4/67	None	Currently in use
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☐ B. PILES		
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☐ F. LANDFILL		
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☒ I. OTHER (Specify) Unknown	Unknown	

04 TREATMENT (Check all that apply)

- ☐ A. INCENERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☒ H. OTHER (Specify) None

05 OTHER

☒ A. BUILDINGS ON SITE

Pump House

06 AREA OF SITE

Unknown (Acres)

07 COMMENTS

The Monroe Township Municipal wells #4 & 5 are located in a residential area of Williamstown. These wells have experienced elevated levels of mercury as high as 6.4 ppb in July 1976. Since that time the levels of mercury has decreased to acceptable tolerances. The source of the groundwater contamination has not been determined and residential potable wells may be at risk. (Att. B)

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☐ C. INADEQUATE, POOR ☒ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

The source of the mercury contamination is not known at the present time. It is suspected that illegal/unauthorized dumping of mercury associated waste within the vicinity has created the present groundwater contamination.

(Att. F)

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☐ YES ☒ NO

02 COMMENTS The subsurface location of the mercury contaminated groundwater precludes the possibility of accessibility to the general public. (Att. B)

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

Attachment B: Site History 6/21/76 to 9/3/86
C: NJDEP Well Record Information
F: Memo to File

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D980769699

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY *(Check as applicable)*

	SURFACE	WELL
COMMUNITY	A. ☐	B. ☒
NON-COMMUNITY	C. ☐	D. ☒

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A. ☐	B. ☒	C. ☐
D. ☐	E. ☒	F. ☐

03 DISTANCE TO SITE

A. 0.0 (mi)
B. 0.5 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY *(Check one)*

☒ A. ONLY SOURCE FOR DRINKING ☐ B. DRINKING *(Other sources available)* COMMERCIAL, INDUSTRIAL, IRRIGATION *(No other water sources available)* ☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION *(Limited other sources available)* ☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER	03 DISTANCE TO NEAREST DRINKING WATER WELL
28,000	on site (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
12 (ft)	SE	17 (ft)	(gpd)	☐ YES ☒ NO

09 DESCRIPTION OF WELLS *(Including useage, depth, and location relative to population and buildings)*

The Monroe Township wells #4 & 5 tap the Cohansey aquifer for public supply usage. The total depth and yield of these wells are: 106', 800 GPM and 160', 510 GPM respectively. These wells are located within Williamstown and have an intervening distance of 1200 feet.

10 RECHARGE AREA		11 DISCHARGE AREA	
☐ YES ☐ NO	COMMENTS	☐ YES ☐ NO	COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE *(Check one)*

☒ A. RESERVOIR, RECREATION DRINKING WATER SOURCE ☐ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C. COMMERCIAL, INDUSTRIAL ☐ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Squankum Branch of Great Egg Harbor River	☐	0.1 (mi)
Hospitality Branch of Great Egg Harbor River	☐	1.3 (mi)
Four Mile Branch of Great Egg Harbor River	☐	1.5 (mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 1700 NO. OF PERSONS	B. 6900 NO. OF PERSONS	C. 15543 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION

0.1 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE	04 DISTANCE TO NEAREST OFF-SITE BUILDING
1800	0.1 (mi)

05 POPULATION WITHIN VICINITY OF SITE *(Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)*

The population within the vicinity is residential, with an average of 550 people per square mile. This figure is an average for all of Monroe Township, with slightly higher population density within Williamstown proper, and sparsly populated at its outskirts.

(Att. G)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D980769699

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☒ C. $10^{-4} - 10^{-3}$ cm/sec ☐ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☒ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☐ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☐ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH	
2000 (ft)	106 (ft)		

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE		
		SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
12 (in)	2.75 (in)	< 5 %	SE	< 5 %

09 FLOOD POTENTIAL

SITE IS IN 500 YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE	OTHER
A. > 5 (mi)	B. 0.8 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

0.8 (mi)

ENDANGERED SPECIES: Bog Turtle

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A. < .1 (mi)	B. < .1 (mi)	C. .5 (mi)	D. .5 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

The Monroe Township Municipal Wells are located in a relatively level area with an average site slope of less than 5 percent. In general, the elevations range from 120 to 170 feet. Surface water drainage is typically toward the south east and the Great Egg Harbor River. A fresh water wetland is also located .8 miles to the south east following the floodplain of the Squankum Branch of the Great Egg Harbor River. Approximately 55 percent of the area has been cleared and is used mainly for general crops, vegetables and fruits.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Attachment:
- Map 1 USGS Wuadrangle Map
- Map 11 Flood Insurance Rate Map
- D Geologic Information
- E Endangered & Threatened Species
- G Memo to File

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NJ	D980769699

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	13	P + P Laboratories, Inc.; NJDEP	Presently Available
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☐ GROUND ☐ AERIAL

02 IN CUSTODY OF _____
(Name of organization or individual)

03 MAPS
☐ YES
☐ NO

04 LOCATION OF MAPS _____

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Attachment A: Monroe MUA - Water Potability Analysis
B: Site History 6/21/76 to 9/3/86

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D980769699

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
Monroe Township		3 South Main Street		Williamstown	NJ	08094

PARENT COMPANY (If applicable)

08 NAME	09 D+B NUMBER	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE	12 CITY	13 STATE	14 ZIP CODE
NA						

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
NA						

IV. REALTY OWNER(S) (If applicable; list most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
NA						

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D980769699

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER
Monroe Township MUA	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
372 South Main Street	

05 CITY	06 STATE	07 ZIP CODE
Williamstown	NJ	08094

08 YEARS OF OPERATION	09 NAME OF OWNER
1951 - Present	Monroe Township

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER
NA	

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

01 NAME	02 D+B NUMBER
NA	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

10 NAME	11 D+B NUMBER
NA	

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D980769699

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
NA	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
NA			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
NA			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NJ	D980769699

II. PAST RESPONSE ACTIVITIES

01 [X] A. WATER SUPPLY CLOSED — 02 DATE 11/3/76 — 03 AGENCY MUA
04 DESCRIPTION Monroe Township MUA closed well #4 for daily water demands and is retained only for emergency situations. (Att. B)

01 [ ] B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 [ ] Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NJ	D980769699

II PAST RESPONSE ACTIVITIES *(Continued)*

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

III. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

Attachment B: Site History 6/21/76 to 9/3/86

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NJ	D980769699

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION [X] YES [ ] NO Well #4 - taken out of daily service.

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

A state program instituted for sampling raw water sources throughout the state had disclosed a mercury contamination in two wells owned and operated by the Monroe Township Municipal Utilities Authority. Sample collection and analysis was conducted and revealed mercury contamination in Well #4 and Well #5 as high as 6.4 ppb and 2.8 ppb respectively. System samples were also collected and analyzed revealing mercury values as high as 10.8 ppb. A subsequent inspection was conducted, but no determination could be made for an immediate source of the mercury. Well #4 was subsequently taken out of service and was retained only for standby purposes to meet a dire emergency such as a major fire. On 7/17/86 an investigation was made by the Gloucester County Health Department into an alleged mercury contamination in a potable well. Subsequent sample analysis revealed 3.6 ppb mercury in the well. The county recommended the use of bottled water until a permanent alternate supply can be provided. A preliminary assessment was conducted by the NJDEP/Bureau of Planning and Assessment on 4/14/87. This investigation has designated this a medium priority site with a potential for population exposure/injury through the use of the residential potable wells.

III. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

Attachment B: Site History 6/21/76 to 9/3/86
I: NJDEP/BPA - Preliminary Assessment 4/14/87

SI REVIEW SHEET

SITE: Monroe Twp. Municipal Wells #4 & 5 AKA: _____

CITY: Monroe Township COUNTY: Gloucester

DATE SAMPLED: FROM 6/21/76 TO 1/29/88 EPA ID #: NJD980769699

SITE LEAD: Gloucester County Health Dept. SITE CONTACT: Steve Webber

SAMPLE MATRIX (# SAMPLES)	BACKGROUND SAMPLE (Y,N)	*SAMPLE PARAMETERS	**QA/QC REVIEW (Y,N)
SOIL _____	OFF SITE _____	_____	_____
GW 13	UPGRADIENT N	Potable water standards and metals	N
SW _____	UPSTREAM _____	_____	_____

COMMENTS: The most recent analysis of Monroe Township Municipal Wells reveal that the inorganic mercury contamination that once plagued these public wells has decreased to within the limits of acceptability for potable water.

REVIEWER: Faranca DATE: 4/15/88

*SPECIFY SAMPLE PARAMETERS: PP+40, HSL, TCL VO SCAN, METALS, ETC.
**FORMAL QA/QC REVIEW BY NJDEP

6-22 10 24

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

TABULATION OF ANALYTICAL DATA FROM PUBLIC WATER SUPPLY

Supply: Monroe MUA County: Gloucester

Municipality: ~~Monroe Twp Williamstown~~ Monroe Twp Date Collected: 6/21/76

Collected by: D Bianco Memo #: W-76 Project # W-

BACTERIOLOGICAL ANALYSES: Coliform organisms determined by the membrane filter technique are reported in colonies per 100 ml. Chlorine residuals are reported in ppm.

Sample Number	Point of Collection	Coliform Organisms		Chlorine Residual	
		Fecal	Total	Free	Total
27986	Well # 4 Raw water Start Washington Ave Williamstown		0	TR	.35
27987	Run 5 min.		0		
27988	Run 10 min.		0		

PHYSICAL — CHEMICAL ANALYSES: Determinations are in ppm except color, odor, turbidity, and pH. Figures in parentheses are from the N. J. Potable Water Standards.

Sample Number	27986				
Color (10)					
Odor (III)					
Turbidity (5)					
pH	4.9				
Alkalinity to pH 4	7				
Nitrate as NO_3 (30)	24.				
Chloride (250)					
Total Dis. Solids (500)	110				
ABS/LAS (0.5)	MEG				
Total Hardness (150)	26				
Total Iron (0.3)					
Manganese (0.05)					
Sodium (50)					
Sulphate (250)					
Fluoride (1.5)	MEG				

Sample Number	27986
Arsenic	MEG
Barium	MEG
Cadmium	MEG
Chromium +6	MEG
Copper	0.14
Cyanide	MEG
Lead	0.02
Mercury	2.0 ppb
Selenium	MEG
Silver	MEG
Zinc	0.07
	MEG

RECEIVED
JUL 15 1976
GLOUCESTER CO.
DEPT. OF HEALTH

Remarks: ~~pH 6.8 5 Mn filter for iron manganese & no filter for fluoride C Operator ... to date~~

SHEET 2 — WATER PURVEYOR

ATTACHMENT B

NEW JERSEY ST[illegible] DEPARTMENT OF ENVIRONMEN[illegible] PROTECTION

TABULATION OF ANALYTICAL DATA FROM PUBLIC WATER SUPPLY

ny: Monroe MUA — County Gloucester

cipality: ~~Monroe Twp~~ Monroe Twp — Date Collected 6/21

ected by: DBurke — Memo # W-76 — Project # W-

BACTERIOLOGICAL ANALYSES: Coliform organisms determined by the membrane filter technique are reported in colonies per 100 ml. Chlorine residuals are reported in ppm.

Sample Number	Point of Collection	Coliform Organisms		Chlorine Residual	
		Fecal	Total	Free	Total
27981	Well #5 Raw water Station Water St Williamstown		0	TR	.35
27982	Run for 5 min.		0		
27983	Run for 10 min.		0		

PHYSICAL – CHEMICAL ANALYSES: Determinations are in ppm except color, odor, turbidity, and pH. Figures in parentheses are from the N. J. Potable Water Standards.

Sample Number	27981					Sample Number	27981
Color (10)						Arsenic	✓ MET
Odor (III)						Barium	✓ MET
Turbidity (5)						Cadmium	✓ MET
pH	✓ 5.1					Chromium +6	✓ MET
Alkalinity to pH 4	✓ 7					Copper	✓ 0.062
Nitrate as NO_3 (30)	✓ 24.					Cyanide	✓ MET
Chloride (250)						Lead	✓ 0.006
Total Dis. Solids (500)	✓ 112					Mercury	✓ 1.8ppb
ABS/LAS (0.5)	✓ MET					Selenium	✓ MET
Total Hardness (150)	✓ 32					Silver	✓ MET
Total Iron (0.3)						Zinc	✓ 0.09
Manganese (0.05)						Phenols	✓ MET
Sodium (50)							
Sulphate (250)							
Fluoride (1.5)	✓ MET						

RECEIVED 1976 JUL 15 AM 10 47 GLOUCESTER COUNTY HEALTH DEPT

RECEIVED JUL 15 1976 GLOUCESTER CO. DEPT. OF HEALTH

Remarks: 4 PH 68 — 5 No facilities for iron manganese & No facilities for fluoride Operators reports received and up to date

SHEET 2 – WATER PURVEYOR

B2

State of New Jersey
Department of Environmental Protection
Division of Water Resources

MEMO

TO Mr. Richard Bellis, Assistant Director, Monitoring, Surveillance and Enforcement Element

FROM Mr. John Wilford, Assistant Director, Water Supply and Flood Plain Management Element DATE November 3, 1976

SUBJECT Mercury Contamination of Ground Water - Monroe Township, Gloucester County

Attached is a copy of a memorandum-report which discloses mercury contamination of the water derived from Wells #4 and #5 of the Monroe Township Municipal Utilities Authority, Gloucester County. As is noted therein, based upon an initial, cursory investigation, personnel of the Bureau of Potable Water have been unable to determine the origin of the mercury. No manometers, or other instruments utilizing mercury, are in use at either of the wells.

I have advised the M.U.A. to immediately undertake the construction of a new well or wells to replace Wells #4 and #5 and, in the interim, to use Well #6 as the main production well, augmented as necessary by Well #5 to meet daily water demands. I have suggested that Well #4 be taken out of service and be retained only for standby purposes to meet a dire emergency such as a major fire.

On the basis of a specific test made on October 5, 1976, the mercury is in the inorganic form. This, fortunately, has less toxic potential than the alkyl (organic) form. However, the National Interim Primary Drinking Water Regulations promulgated by EPA pursuant to the Safe Drinking Water Act, which will become effective in June 1977, impose a maximum contaminant level for total mercury (0.002 mg/l), and make no differentiation between the inorganic and organic forms.

On the basis of the findings by the Bureau of Potable Water, it is requested that you will refer the matter to your Office of Special Services and have them conduct an intensive survey to determine, if possible, the origin of the mercury.

11/10
Dave Franklin // ASAP
KGS

JW:bn

Enclosure

cc: Mr. Zelikson

B3

Mr. Wilford

Messrs. Laffey and Vora

November 3, 1976

Mercury Contamination, Monroe Township Municipal Utilities Authority

The recently instituted program for sampling raw water sources throughout the State has disclosed a mercury contamination in two wells owned and operated by the Monroe Township Municipal Utilities Authority, Gloucester County, New Jersey.

The three operating wells of this system were sampled on June 21, 1976. Wells #4 and #5 showed mercury values of 2.0 ppb and 1.8 ppb respectively, while Well #6 yielded a negative result. The mercury contamination in Wells #4 and #5 was confirmed by samples taken on July 19, August 18, August 24, and October 18, 1976 with results ranging from 1.4 ppb to 6.4 ppb in Well #4 and from 0.8 to 2.8 ppb in Well #5. On October 5 and October 15, 1976 the water from Well #5 was negative for mercury, but Well #4 showed values ranging between 1.4 ppb and 2 ppb. The October 5 sample from Well #4 showed that the mercury was all of the inorganic type. System samples taken on August 18, August 24, October 10 and October 18 showed mercury values ranging from 1.0 ppb to 10.8 ppb. A tabulation of the analytical results is attached.

An inspection of the Monroe Township M.U.A. system was conducted on October 5, but no determination could be made for an immediate source of the mercury. Wells Nos. 4 and 5 are located respectively in Washington Avenue and Chestnut Streets, with an intervening distance of 1,200 feet.

Well #4 is the main production well for the system, having a reported yield of 800 gpm. It was constructed in 1952, taps the Cohansey Aquifer, and is cased to its full depth of 106 feet. Our records do not indicate whether or not the annular space is sealed. The formation log shows a clay layer between 35 feet and 44 feet.

Well #5 was constructed in 1967 and has a reported yield of 500 gpm. It taps the Bridgeton Tertiary Cohansey aquifer, and is 160 feet deep. The annular space between the casing and the drill hole is sealed to a depth of 127 feet. The formation log shows the presence of a clay layer between 58 feet and 63 feet, and a layer of hardpan between 84 feet and 89 feet.

A tour of the area surrounding Wells Nos. 4 and 5 failed to indicate any probable sources of mercury contamination with the exception of the Violet Packing Company located 0.5 miles west of Well #5. This company is engaged in the production of tomato sauces. It operates seasonally during the summer months and, during operations, produces about 200,000 gallons of wastewater

B4

per day which is treated by pH adjustment, aeration and settling, prior to disposal either to the sanitary sewer or on to adjacent farmland. During the 1976 season their wastes were disposed of to the ground.

There are several sewing factories located in various parts of the Township, engaged in the manufacture of clothing, but these are believed to be all dry industries. There is a sanitary landfill located approximately one mile north of wells #4 and #5, but this is not known to receive chemical wastes.

A total of 24 public water supply wells in the area surrounding Monroe Township was sampled, all with negative results for mercury. A tabulation of these wells is also attached.

The results of the various samples taken show, conclusively, that the water from Wells #4 and #5 contains mercury, and that this constituent is also present in the delivered water. Current New Jersey Potable Water Standards and the 1962 P.H.S. Drinking Water Standards do not include a maximum contaminant level for mercury, though there is a "rule of thumb" maximum of 2.0 ppb. The recently-promulgated National Interim Primary Drinking Water Regulations, however, which will become effective in June 1977, include a maximum contaminant level of 2.0 ppb, for mercury, and though inorganic mercury is considered to be of far less toxic potential than organic mercury, the imposed value is for total mercury.

The operator of the system has been informed of these findings but, to date, they have not been officially brought to the attention of the Monroe Township M.U.A. It is, therefore, our recommendation that they be apprised of the situation so they can take immediate steps to develop alternate sources of water prior to the effective date of the National Interim Primary Regulations and thus avoid the appropriate public reporting requirements and the necessity for applying for an exemption or waiver in accordance with the requirements of the federal Safe Drinking Water Act. It is further recommended that this matter be referred to the Office of Special Services with a request that they will conduct an intensive search of the area to determine if there is a local industry that is discharging mercury contaminated wastes.

Respectfully submitted,

William Laffey

Bhupendra Vora

WL&BV:JW:bn
Attachments

B5

MONROE TWP. MUA, GLOUCESTER COUNTY
TABULATION OF MERCURY RESULTS

DATE	SAMPLING POINT						
	WELL #4		WELL #5		WELL #6		SYSTEM
	RAW	DELIVERED	RAW	DELIVERED	RAW	DELIVERED	- 372 Main St.
	MERCURY CONTENT IN ppb						
6-21-76 [W-76]	2.0		1.8		Neg.		
7-19-76 [Memo #312]	6.4		2.8				
8-18-76 [Memo #338]	4.2		1.4				10.8
8-24-76 [Memo #358]	4.2		1.6		Neg.		1.0
10-5-76 [Routine Insp]	1.4 [total] 1.4*	Neg.	Neg.	Neg.	Neg.		
10-15-76	Hr.						
Well #4 Runs.	0 -1.6		Neg.				1.2
Well #5 Rested	1 -1.6		Neg.				
For 12 hours	2 -1.6		Neg.				
and then took samples	4 -2.0		Neg.				
At 0, 1, 2, 4, 5 Hours	5 -1.4		Neg.				
[Memo #438]							
10-18-76	Hr.						
Well #5 Runs.	0 -6.0		1.0				1.6
Well #4 Rested	1 -4.0		1.0				
For 12 hours	2 -3.4		1.0				
and then took samples	4 -3.8		0.8				
At 0, 1, 2 4, 5 Hours	5 -3.9		1.0				
[Memo #438].							

* Inorganic Mercury.

B6

STIVE PROTECTION SERVICE

QUALITY CONTROL LABORATORY

Bacteriological and Chemical Analysis

243 WHITE HORSE PIKE AUDUBON, N.J. 08106 (609) 428-1303

ATER FOOD

Date of collection Dec. 16, 19 76. Hour of Collection 8-9-10-11-12 A.M./P.M. Analysis No. 127616-344

Company Monroe MUA Address Phone

Sample taken from By Jim Davis

Condition of sample when drawn S.T.P.

Collector's Remarks

Date Delivered to Laboratory 12/16, 19 76 Time

Condition of Sample upon arrival at Laboratory

CHEMICAL

TEST	REQ?	PRES. ABS.	QUAN.	METH.	TECH. IN.	TEST	REQ?	PRES. ABS.	QUAN.	METH.	TECH. IN.
id						Mercury		less	than 0.001		mg/l
kalinity											
uminum						Nitrate					
mmonia						Nitrite					
senic						Odor					
.D.						Oil & Grease					
omides						Pesticides					
rbon Dioxide						pH		8.1			
dmium						Phenols					
l. Hardness						Phos. Ortho					
O.D.						Phos. Tot.					
lorides						Residue Tot.					
lorides OTA						Residue Filtr.					
lorides Total						Residue Non-Filt.					
l.Hydrocarbons						Set. Material					
romate						Sodium					
pper						Solids					
s. Oxygen						Spec. Cond.					
s. Solids						Sulfate					
luorides						Sulfide					
ardness						Sulfite					
ydrogen Sulfide						Sus. Matter		358	mg/l		
on (Ferric)						Toxicants					
n (Ferrous)						Turbidity					
eldahl N						T.D.S.					
ead						Total Solids					
agnesium						Zinc					
enganese											
ionic(ABS&LAS)						Cationic					
ionic (sulfated)						Nonionic					

BACTERIOLOGICAL

TEST	AGG. PLATE	DIL. CELLS	TOTAL	METH.	TECH. IN.	TEST	AGG. PLATE	DIL. CELLS	TOTAL	METH.	TECH. IN.
tal Cells											
liform											
cal Strep.											

Remarks

B7

STROKA SIPPEL MASTELLER
& ASSOC., INC.

ENGINEERING & SURVEYING

ROBERT J. SIPPEL, LS, PP
EARL H. MASTELLER, PE
NELSON L. HOOVER, LS
JOHN E. LORENZ

336 ROUTE 70, MARLTON, NEW JERSEY 08053
609.983.7260

December 23, 1976

Mr. Gustav Mihlebach, Superintendent
Monroe Municipal Utilities Authority
372 S. Main Street
Williamstown, New Jersey 08094

Re: N.J.D.E.P. Special Services
Potable Water Well Survey

Dear Gus:

Pursuant to your request on December 21, 1976, a field crew ran the necessary levels to determine the elevations of wells 4, 5, 6 and the Violet Packing Co. well. The bench marks used were New Jersey Geodetic Control Survey monuments.

Well #4 - Washington Avenue

Well house finish floor elevation 139.25

Top of concrete pump motor base elevation 141.14

Well #5 - Chestnut Street & Water Street

Well house finish floor elevation 165.26

Well #6 - Lake Avenue & Ellen Terrace

Top of concrete pump motor base elevation 144.30

Violet Packing Co. Well - Railroad Avenue

Top of flange of submersible well discharge piping elevation 155.39

B8

If you should request any additional information or have any questions, please do not hesitate to call me.

Very truly yours,

Robert G. Volk

RGV:nl

MONROE MUNICIPAL UTILITIES AUTHORITY

372 SOUTH MAIN STREET
WILLIAMSTOWN, NEW JERSEY 08094

Dave

GUSTAV MIHLEBACH, Superintendent
Phone: 629-4400

Amanda M. Miles
Administrative Clerk
Phone 629-4400

December 27, 1976

1976 DEC 30 PM 2 39

State of New Jersey
Dept. of Environmental Protection
Division Water Resources
P. O. Box 2809
Trenton, N. J. 08625 David Shartart
Attn: Mr. David Longstreet
Supervision, Hazardous Material Program

Re: Mercury Contaminate
Wells # 4, and # 5

3-1415

Dear Dave:

Per your request, enclosed are logs on Wells # 5, #6, and Violet Packing Cannery; also a letter from our engineering firm stating the elevations of the four (4) wells.

An analysis for Mercury performed by Quality Control Lab on the sewage treatment plant effluent is also enclosed.

588 3400

Very truly yours,

Monroe Municipal Utilities Authority

Gustav Mihlebach

Gustav Mihlebach
Superintendent

GM:am

encl: 4
cc: Mr. Volk
file

Bic

Chem-25
Sept. 75

NEW JERSEY STATE DEPARTMENT OF HEALTH
STREAM OR WASTEWATER ANALYSIS

Time & Date Received _____
By Labs
Lab. No. _____

FIELD INFORMATION

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

Date of Collection 2 - 8 - 1977
Hour 12 00 A.M. _____ P.M. ✓
Sample No. 18582
Composite Period Grab Interval _____
Collected by [illegible]
Municipality [illegible] Twp.
Residual Chlorine:
Immediate _____
Plant VIOLET PACKING CO.
Developed _____
Stream _____
Flow Rate _____
Location [illegible] ROAD AVE
Temperature _____
Description and Remarks: WELL

ITEMS CIRCLED BELOW ARE UNSATISFACTORY

Dilutions Requested (Bacteriological)

10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}

LABORATORY RESULTS
BACTERIOLOGICAL

Coliform MPN/100 ml. _____ (Confirmed Test); Fecal Coliform MPN/100 ml. _____

Fecal Streptococci:MPN/100 ml. _____ Other _____

CHEMICAL AND PHYSICAL ANALYSES (mgs./liter, unless otherwise noted)

	Color (units)		Chloride		Sulfate		Other Determinations
	Odor (cold)		Suspended Solids		Grease & Oil	/	MERCURY NEG—
	Turbidity (units)		Ash		Cyanide		
	pH		Total Solids		Chromium Total		
	Acidity to pH 4		Ash		Chromium Hex.		
	Alkalinity to pH 4		Total PO_4		Ortho - PO_4		
	Nitrite N		MBAS		Copper		
	Nitrate N		Phenols		Lead		
	Ammonia N		COD		Arsenic		
	Total Kjel. N		Iron		Zinc		

BIOCHEMICAL OXYGEN DEMAND (mgs./liter)

Field D.O.		Lab. D.O.			Seed Required:		Yes		No			
Sample Conc. %	PLEASE CIRCLE	0.1	0.2	0.5	1.0	2.0	5.0	10	25	50	75	100
BOD_5												

B11

H1711

Chem-25
Sept. 75

W JERSEY STATE DEPARTMENT OF H[illegible]
STREAM OR WASTEWATER ANALYS[illegible]

Time & Date Received 12 8/11/77
By Labs
Lab. No. Th386 D FS

FIELD INFORMATION

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

Date of Collection 8 -11- 1977
Hour 10:15 A.M. X P.M.
Sample No. 20636
Composite Period GRAB Interval
Collected by MENKEL + PATTERSON
Residual Chlorine:
Municipality MONROE TWP
Immediate
Plant VIOLET PACKING
Developed
Stream
Flow Rate
Location
Temperature
Description and Remarks: POND (AERATION LAGOON)

RECEIVED
SEP 16 1977

State of New Jersey
Dept. Environmental Protection
Division Water Resources

ITEMS CIRCLED BELOW ARE UNSATISFACTORY

Dilutions Requested (Bacteriological)

10	1	10-1	10-2	10-3	10-4	10-5	10-6
	✓	✓	✓				

LABORATORY RESULTS

BACTERIOLOGICAL

Coliform MPN/100 ml. 24000+ (Confirmed Test) Fecal Coliform MPN/100 ml. 3500.
Fecal Streptococci:MPN/100 ml. 2400+ Other

CHEMICAL AND PHYSICAL ANALYSES (mgs./liter, unless otherwise noted)

✓	Color (units)	ND	✓	Chloride	64	✓	Sulfate	42		Other Determinations	
✓	Odor (cold)	VD	✓	Suspended Solids	66	✓	Grease & Oil	104.0	✓	SODIUM	310.
✓	Turbidity (units)	50	✓	Ash	24		Cyanide		✓	POTASSIUM	47.
✓	pH	9.5	✓	Total Solids	1180	✓	Chromium Total	0.045	✓	CADMIUM	0.002
	Acidity to pH 4		✓	Ash	904	✓	Chromium Hex.	ND			
	Alkalinity to pH 4		✓	Total PO_4	6.9		Ortho - PO_4				
✓	Nitrite N	0.055	✓	MBAS	< 0.3		Copper				
✓	Nitrate N	ND		Phenols			Lead				
✓	Ammonia N	4.0	✓	COD	360		Arsenic				
✓	Total Kjel. N	17.9	✓	Iron	2.8	✓	Zinc	0.48			

DIVISION OF LABORATORIES
ANALYSIS COMPLETED
SEP 19 1977

REPORT SUBMITTED

BIOCHEMICAL OXYGEN DEMAND (mgs./liter)

Field D.O.		Lab. D.O. 0			Seed Required:			Yes		No			
Sample Conc. %	PLEASE CIRCLE	0.1	0.2	0.5	1.0	2.0	5.0	10	25	50	75	100	
BOD5			←		←		137						

B12

PART 1-CHEMISTRY COPY

H1832

Chem-25
Sept. 75

NEW JERSEY STATE DEPARTMENT OF HEALTH
STREAM OR WASTEWATER ANALYSIS

Time & Date Received 8/11/77
By Labs
Lab. No. Th385

FIELD INFORMATION

PLEASE TYPE OR PRINT
WITH BALLPOINT PEN

Date of Collection 8-11 1977
Hour 11:10 A.M. X P.M.
Sample No. 20634
Composite Period GRAB Interval
Collected by MENNEL & PATTERSON
Municipality MONROE TWP
Residual Chlorine:
Immediate
Plant VIOLET ROAD
Developed
Stream
Flow Rate
Location
Temperature
Description and Remarks: ~~RAW~~ ~~EFFLUENT~~ PH ADJUSTED.
AND SCREENED (EFFLUENT TO GCSA)

ITEMS CIRCLED BELOW ARE UNSATISFACTORY

Dilutions Requested (Bacteriological)

10	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}
	/	/	/				

LABORATORY RESULTS

BACTERIOLOGICAL

Coliform MPN/100 ml. 24,000+ (Confirmed Test) Fecal Coliform MPN/100 ml. 24,000+
Fecal Streptococci:MPN/100 ml. 2400+ Other

RECEIVED
SEP 16 1977
State of New Jersey
Dept. Environmental Protection
Division Water Resources

CHEMICAL AND PHYSICAL ANALYSES (mgs./liter, unless otherwise noted)

✓	Color (units)	ND	✓	Chloride	15	✓	Sulfate	85		Other Determinations	
✓	Odor (cold)	TVD	✓	Suspended Solids	520	✓	Grease & Oil	67.4	✓	Sodium	22.
✓	Turbidity (units)	200	✓	Ash	212		Cyanide		✓	Potassium	60
✓	pH	4.5	✓	Total Solids	1216	✓	Chromium Total	0.005	✓	Cadmium	0.003
	Acidity to pH 4		✓	Ash	488	✓	Chromium Hex.	ND			
	Alkalinity to pH 4		✓	Total PO_4	10.0		Ortho - PO_4				
✓	Nitrite N	0.025	✓	MBAS	< 0.3		Copper			DIVISION OF LABORATORIES	
✓	Nitrate N	3.5		Phenols			Lead			ANALYSIS COMPLETED	
✓	Ammonia N	11.1	✓	COD	1240		Arsenic			SEP 12 1977.	
✓	Total Kjel. N	39.8	✓	Iron	8.0	✓	Zinc	0.75		REPORT SUBMITTED	

BIOCHEMICAL OXYGEN DEMAND (mgs./liter)

Field D.O.		Lab. D.O.	0		Seed Required:	Yes		No				
Sample Conc. %	PLEASE CIRCLE	0.1	0.2	0.5	1.0	2.0	5.0	10	25	50	75	100
✓ BOD_5			<—		651	>—						

B13

Executive Offices: Water Research Building
44 Sintsink Drive East
Port Washington, New York 11050
Phone 516 883-6760 Cable WATER

Geraghty & Miller, Inc.

CONSULTING GROUND-WATER GEOLOGISTS AND HYDROLOGISTS

Mr. Gustav Mihlebach
Monroe Utilities Authority
372 S. Main Street
Williamstown, New Jersey

Dear Sir:

Enclosed are the water quality analyses of the samples collected from your wells in January. This work was done as a part of the Delaware Valley Regional Planning Commission study of ground- and surface-water contamination being conducted in Gloucester, Camden, Burlington and Mercer Counties.

Thank you for your cooperation.

Sincerely,

GERAGHTY & MILLER, INC.

Paul Roux

PR:am
Enclosure

B14

PENN ENVIRONMENTAL CONSULTANTS, INC.
FORT PITT PROFESSIONAL BUILDING
1517 WOODRUFF STREET
PITTSBURGH, PA. 15220
412–381-1133

WATER ANALYSIS REPORT

CLIENT: Geraghty & Miller | PEC PROJECT NO.: 253-338

SAMPLE SOURCE TIME AND DATE: OVRC Morgan mva Well 4 2/11

DATE RECEIVED: 2-17-77 | CHEMIST: RM | TYPE OF SAMPLE: | SAMPLE NO.: 25335

BASIC PARAMETERS		NUTRIENTS		ORGANICS	
pH-Units	4.9	NO_2-N mg/l		TOC mg/l	
ALK-TOT mg/l as $CaCO_3$	12	NO_3-N mg/l	3.1	COD mg/l	
ACID mg/l as $CaCO_3$		NH_3-N mg/l		BOD_5 mg/l	
pH_8 HOT mg/l as $CaCO_3$		PO_4-P ortho mg/l		CN-TOT mg/l	
COLOR Pt-Co Units		PO_4-P total mg/l	.03	CN-AMENABLE mg/l	
TURBIDITY JTU		TKN mg/l		OILS-EXT mg/l	
SO_4 mg/l	<1	METALS		PHENOL mg/l	
SP COND. µmhos/cm		Al mg/l		MBAS mg/l	
HARD-T mg/l		Cd mg/l	<.01	BACTERIOLOGICAL	
Ca mg/l	24	Cr mg/l	<.01	TOT-COLIFORM colonies/100 ml	
Mg mg/l	7.0	Cu mg/l	.17	FECAL-COLIFORM colonies/100 ml	
Cl mg/l	13	Fe-TOT mg/l	.16	FECAL STREP colonies/100 ml	
F mg/l		Fe-DISS mg/l		ADDITIONAL	
SOLIDS		K mg/l	2.0	Co mg/l	<.01
TOTAL mg/l @ 103°		Mn mg/l		Hg mg/l	.004
TOT VOL mg/l @ 550°		Na mg/l	7.4	Ag mg/l	<.03
SUSP mg/l @ 103°		Ni mg/l	<.03		
SUSP-VOL mg/l @ 550°		Pb mg/l	<.03		
DISS mg/l @ 180°	95	Si mg/l			
SETTLE ml/l		Zn mg/l	.20		

REMARKS:

B15

PENN ENVIRONMENTAL CONSULTANTS, INC.
FORT PITT PROFESSIONAL BUILDING
1517 WOODRUFF STREET
PITTSBURGH, PA. 15220
412-381-1133

WATER ANALYSIS REPORT

CLIENT	PEC PROJECT NO.
Geraghty & Miller	253-338

SAMPLE SOURCE TIME AND DATE: OVEC Monroe Well 5 2/11

DATE RECEIVED	CHEMIST	TYPE OF SAMPLE	SAMPLE NO.
2-17-77	BR		25336

BASIC PARAMETERS		NUTRIENTS		ORGANICS	
pH-Units	4.8	NO_2-N mg/l		TOC mg/l	
ALK-TOT mg/l as $CaCO_3$	12	NO_3-N mg/l	24.7	COD mg/l	
ACID mg/l as $CaCO_3$		NH_3-N mg/l		BOD_5 mg/l	
pH_8 HOT mg/l as $CaCO_3$		PO_4-P ortho mg/l		CN-TOT mg/l	
COLOR Pt-Co Units		PO_4-P total mg/l	.02	CN-AMENABLE mg/l	
TURBIDITY JTU		TKN mg/l		OILS-EXT mg/l	
SO_4 mg/l	1.2	**METALS**		PHENOL mg/l	
SP COND. µmhos/cm		Al mg/l		MBAS mg/l	
HARD-T mg/l		Cd mg/l	<.01	**BACTERIOLOGICAL**	
Ca mg/l	3.3	Cr mg/l	<.01	TOT-COLIFORM colonies/100 ml	
Mg mg/l	3.4	Cu mg/l	<.01	FECAL-COLIFORM colonies/100 ml	
Cl mg/l	16	Fe-TOT mg/l	.13	FECAL STREP colonies/100 ml	
F mg/l		Fe-DISS mg/l		**ADDITIONAL**	
SOLIDS		K mg/l	2.4	Cr mg/l	<.01
TOTAL mg/l @ 103°		Mn mg/l		Hg mg/l	.001
TOT VOL mg/l @ 550°		Na mg/l	9.8	As mg/l	<.01
SUSP mg/l @ 103°		Ni mg/l	<.03		
SUSP-VOL mg/l @ 550°		Pb mg/l	<.03		
DISS mg/l @ 180°	76	Si mg/l			
SETTLE ml/l		Zn mg/l	<.01		

REMARKS:

B11

TABULAT[illegible] F ANALYTICAL DATA FROM PUBLIC [illegible] 'ER SUPPLY

Supply Monroe MUA — County Gloucester

Municipality Monroe Twp — Date Collected 2/4/77

Collected by Bruno — HTL Memo # 560 — Project # W[illegible]

BACTERIOLOGICAL ANALYSES: Coliform organisms determined by the membrane filter technique are reported in colonies per 100 ml. Chlorine residuals are reported in ppm.

Sample Number	Point of Collection	Coliform Organisms		Chlorine Residual	
		Fecal	Total	Free	Total
32003	Violet Packing Co - Raw water				
	123 Railroad Ave				
32004	well #5 - Raw water				
	Water St				
32005	well #4 - Raw water				
	Washington Ave				

PHYSICAL - CHEMICAL ANALYSES: Determinations are in ppm except color, odor, turbidity, and pH. Figures in parentheses are from the N. J. Potable Water Standards and/or National Interim Primary Regulations.

Sample Number				32005	32004	Sample Number	32003
Color (10)						Arsenic (0.05)	
Odor (III)						Barium (1.0)	
Turbidity (5)						Cadmium (0.010)	
pH						Chromium $^{+6}$ (0.05)	
Alkalinity to pH 4						Copper (1.0)	
Nitrate as NO_3 (45)						Cyanide (0.20)	
Fluoride (250)				* 5.0 PPB	1.4 PPB	Lead (0.05)	
Total Dis. Solids (500)				- Missing Missing		Mercury (0.002)	ND
MBS/LAS (0.5)						Selenium (0.01)	
Total Hardness (150)						Silver (0.05)	
Total Iron (0.3)						Phenol (0.001)	
Manganese (0.05)						Endrin (0.0002)	
Sodium (50)						Lindane (0.004)	
Sulphate (250)				RECEIVED		Methoxychlor (0.1)	
Chloride (1.5)						Toxaphene (0.005)	
Zinc (5.0)				MAR 9 1977		2.4-D (0.1)	
						Silvex (0.01)	

Remarks * Exceeds Standard — GLOUCESTER CO DEPT OF HEALTH

SHEET 4 — BACTERIOLOGY LAB

B18

MEMORANDUM

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

TO: Robert L. Vincent thru Joseph M. Mikulka

FROM: William J. Mendel, Jr. and Paul F. Tomkavage

SUBJECT: Violet Packing Company, Monroe Township
Gloucester County

DATE: March 15, 1977

On February 8, 1977 we conducted an investigation of the Violet Packing Company. During this investigation we met with Mr. James V. Sclafani, the President of the Company, who answered our questions and showed us around the Plant. He explained that their principal raw material is tomatoes. The tomatoes as they come in are washed and then cooked and processed into tomato sauce. The wash water and the process wastewater are treated in their pre-treatment plant before being discharged into the Monroe Township Sewerage System. The firm operates and discharges only during the months of July, August and September. The discharge is restricted to the hours of 12:00 a.m. to 4:00 a.m. The pre-treatment system consists of a bar screen, a tank for pH adjustment, a tank for the addition of alum, three primary settling lagoons, an aeration lagoon and a final settling lagoon. The primary settling lagoons have rubber liners but the liners are torn and have holes in numerous places. The aeration lagoon and final settling lagoon are unlined. Mr. Sclafani informed us that he is having problems with vandalism at the plant.

After our inspection of the Violet Packing Company we met with Mr. Gustav Mihlebach, Superintendent for the Monroe Municipal Utilities Authority. He informed us that although Violet Packing is tied into the Municipal System, they did not discharge into the system during the 1976 season, but had been discharging to a field behind their plant. This information was based on his knowledge of the Monroe M.U.A. treatment plant's flows. Mr. Sclafani, however, informed us that the only time he discharged to the field behind his plant, was when the pump motors burned out.

At the request of Richard Dalton, of Special Services, we took a sample of Violet Packing's well water. The requested parameter for this sample was for Mercury. The result of this analysis was negative.

A39:MC

B19

MEMORANDUM

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

TO: Richard Dalton

FROM: Robert L. Vincent RLV

SUBJECT: Violet Packing Company, Monroe Township
Gloucester County

DATE: MAR 17 1977

On February 8, 1977 Basin Personnel inspected the above referenced facility. This inspection revealed the existence of two unlined lagoons and three lined lagoons, which are in a state of disrepair, for the pretreatment of food processing wastewater prior to discharge into the municipal system. The plant is "down" now and use of these facilities is not expected to be resumed until processing starts again sometime early this summer.

I would appreciate comment from you concerning the use of the unlined lagoons for this type of wastewater.

A39:MC

B20

M. M. U. A. Water Supply System

11-3-76 Ltr from N.J.D.E.P. Mr. Wilford
Re: Raw Water Tests on # 4 and # 5 Wells
Mercury Levels

11-12-76 Meeting with Mr. Skinovi
Re: New Well, Mercury Content

Meeting with Auditor Mr. Nightinger
Re: Financial Condition of M.M.U.A.
General Fund

11-16-76 Meeting with John Neider, Ernie Anderson, Harry Abentzer - AC Schultes
Re: Cost Figures New 1000 GPM Well
Discussed Mercury content

11-18-76 Grab samples - Raw Waters from Wells # 4 and # 5 delivered to
Technological Services, Camden
Quality Lab. Audubon
Re: Tests on Mercury
Lead
Zinc
Chromium
Copper

11-24-76 Ltr to N.J.D.E.P. Mr. John Wilford
Re: Progress and Steps taken to date regarding
Mercury levels

11-24-76 Called Joe Miller N.J.D.E.P. Water Resources (Pollution)
Re: Steps taken on Mercury

11-29-76 Meeting with our Engineering Firm Bob Volk Earl Hostetler
Re: Mercury in Wells and Budget Figures

12-1-76 Meeting with Mr. Manovi
Re: Progress report on Wells

Quality Control Laboratory, Audubon

Test Results	#4	#5	taken on 11-18-76
Copper	less than 0.5	0.5	
Lead	0.04	0.10	
Zinc	0.12	0.26	
Chromium	less than 0.03	0.03	
Mercury	0.0046	0.001	

12-3-76 Technological Resources, Inc. Camden

Test Results	#4	#5	taken on 11-18-76
Copper	0.14	0.01	
Lead	< 0.005	0.005	
Zinc	0.05	0.005	
Chromium	< 0.02	0.02	
Mercury	0.0035	0.0021	

12-10-76 Meeting with Geo Schultz Jr., Don Tongue, Bob Volk at Schultz
Re: Mercury in Williamstown area
Plot Wells of various depths in Area
Map
Locate the massive concentration
Test wells
Can new well be located at base of new elevated Tower
Cohansey Strata - Sand

B22

(609) 468-3396

VAL ASSOCIATES

Plating Analysis & Consulting
For Electronics Industry
Water, Air & Soil Analysis

P.O. Box 162

Gloucester
Monroe MUA

PHILIP V. DATZ, JR.
Chemist

748 Ridge Drive Road
Mantua, New Jersey 08051

June 9, 1978

Water Analysis Samples

Location - ~~Hubert Boulavard~~ Tower

5/26/78 Sample Taken
Mercury Filtered - .4 ppb

5/26/78 Sample Taken
Mercury Unfiltered - .4 ppb

Well # 4

5/8/78 Sample Taken
Mercury - .35 ppb

5/10/78 Sample Taken (Well # 4)
Mercury - 1.6 ppb

B23

June 75 1980 ROUTIN[illegible]NSPECTION REPORT - PUBLIC WAT[illegible] SUPPLY [illegible] Page 1

PWS ID NO. 0811002

Water Supply Purveyor Monroe Municipal Utilities Authority Date March 20, 1980

Municipality Monroe Township County Gloucester

Mailing Address 372 South Main Street, Williamstown, New Jersey 08094

Administrator Mr. J.V. Dinovi, Chairman Lic. Operator: T Gustav Mihlebach 609-629-5300 (plant) 609-589-2976(home) W same

Business Phones: 609-629-4400

Person Interviewed Mr. Gustav Mihlebach Position Superintendent

1. Source: Location, Description, Capacity (mgd) Washington Ave. Well # 4-0.72 mgd (for emergency use only), Chestnut Street & Water Street Well # 5-0.81 mgd, Ellen Terrace & Lake Ave. Well # 6-0.60 mgd, corkery Lane Well # 7-1.14 mgd.

Est. Total Effective Cap. (mgd) 3.27

2. Treatment: Wells # 4,5, & 6-Chlorination (gas) and pH adjustment with Caustic Soda. Well # 7-chlorination (gas) and pH adjustment with lime.

Est. Total Effective Cap. (mgd) 3.27

3. Finished Water Storage: Description, Capacity (MG) Chestnut & Water St. elevated tank-0.15 mg, Herbert Blvd. elevated tank-0.30 mg, Corkery Lane & Black Horse Pike elevated tank-1.0 mg

Est. Total Effective (MG) 1.45

4. Auxiliary Power Well # 4-gasoline engine direct drive, Well # 5-diesel engine , direct drive, Well # 7-diesel generator for well & treatment. Total 2.67 mgd

5. Emergency Interconnections none

Max Day 1.63(10/25/79) Min. Day .124 (1/31/80)

6. Plant Delivered (mgd): Maximum 1.022 (7/79) Minimum .520 (3/80) Annual Average .801

Bulk Purchase From none mgd

Bulk Sale To none mgd

7. Number of Services 2,699 % Metered 100 Total Est. Population Serviced 9,400

8. Municipalities served and est. services in each Monroe Twp

9. Distribution Mains: Size 2 to 12 ins. Pressures 40 to 50 psi. Fire Hydrants yes

10. Water restrictions

11. New Construction & Project # none

12. Plant Chemical-Physical Analysis (type, freq.) Chlorine residuals twice a day; pH is checked daily

13. Monthly bacteriological sampling of system by purveyor: No. required 10 No. taken 10

Name of Laboratory Quality Control Laboratory, Audubon, N.J.

M6410

B2

Monroe Municipal Utilities Authority

372 South Main Street
Williamstown, New Jersey 08094

Gustav Mihlebach
Superintendent
Phone: 629-4400

Jacqueline Schoenewald
Office Manager
Phone: 629-4400

August 5, 1980

State of New Jersey
Department of Environmental Protection
Division of Water Resources
P.O. Box CN-029
Trenton, New Jersey 08625

Attention: Mr. Daniel S. Mozer
Senior Environmental Engineer

RE: Inspection Report
March 20, 1980

Dear Mr. Mozer:

In the Inspection report - under number 14 deficiencies noted:

(1) Well #4 blow off has been screened to prevent entry of any foreign matter.
(2) Well #4 is not being used, the monthly report to N.J.D.E.P. is marked off line.

Under number 17 Immediate requirements:

(1) Well #4 is Off Line.
(2) Well #5 is being used to meet the heavy daily demand.
(3) We are increasing the percentage of lime in the slurry solution to adjust the pH.

Very truly yours,

MONROE MUNICIPAL UTILITIES AUTHORITY

Gustav Mihlebach

GUSTAV MIHLEBACH
Superintendent

GM/cdf
cc: File

B26

TABULAT[illegible] ANALYTICAL DATA FROM PUBLIC [illegible]ER SUPPLY

Supply MONROE MUNICIPAL UTILITIES AUTHORITY County GLOUCESTER

Municipality MONROE TWP. Date Collected 3-23-82

Collected by Brian Keane Memo # 82-67 Project # W [illegible]

BACTERIOLOGICAL ANALYSES: Coliform organisms determined by the membrane filter technique are reported in colonies per 100 ml. Chlorine residuals are reported in ppm.

Sample Number	Point of Collection	Coliform Organisms ~~Fecal~~	Coliform Organisms ~~Total~~	Chlorine Residual Free	Chlorine Residual Total
06384	WELL #6, LAKE AVE (RAW WATER)	9:45AM		0	0
06385	WELL #7, CORKERY LN.	10:20		↓	↓
06386	TEST WELL, AVERY DR.	11:00		↓	↓
06387	WELL #4, WASHINGTON ST.	11:40 AM		↓	↓

PHYSICAL – CHEMICAL ANALYSES: Determinations are in ppm except color, odor, turbidity, and pH. Figures in parentheses are from the N. J. Potable Water Standards and/or National Interim Primary Regulations.

Sample Number			06384	Sample Number	06385	06386	06387
Color (10)				Arsenic (0.05)			
Odor (III)				Barium (1.0)			
Turbidity (5)				Cadmium (0.010)			
pH				Chromium $^{+6}$ (0.05)			
Alkalinity to pH 4				Copper (1.0)			
Nitrate as NO_3 (45)				Cyanide (0.20)			
Chloride (250)				Lead (0.05)			
Total Dis. Solids (500)				Mercury (0.002)	<0.0005 K	0.0012	*0.0044
ABS/LAS (0.5)				Selenium (0.01)			
Total Hardness (150)				Silver (0.05)			
Total Iron (0.3)				Phenol (0.001)			
Manganese (0.05)				Endrin (0.0002)			
Sodium (60)				Lindane (0.004)			
Sulphate (250)				Methoxychlor (0.1)			
Fluoride (2.0)				Toxaphene (0.005)			
Zinc (5.0)				2,4-D (0.1)			
				Silvex (0.01)			

RECEIVED MAY 3 1983

Remarks WELL #5 OUT OF SERVICE AT TIME OF SAMPLING

WELL #4 PUMPED TO WASTE 2 HRS PRIOR TO SAMPLING

*Exceeds Standard

SHEET 2 – WATER PURVEYOR

B-27

Gloucester Co. (Potable Water)

RECEIVED

MAR 17 198

N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION BUREAU OF POTABLE WATER

Monroe Municipal Utilities Authority

372 South Main Street
Williamstown, New Jersey 08094

Gustau Mihlebach
Superintendent
Phone: 629-4400

Jacqueline Schoenewald
Executive Director
Phone: 629-4400

March 15, 1982

N.J. State Dept. Environmental Protection
P.O. Box 2809
Trenton, New Jersey

Attention: Mr. Dan Mozer RE: Groundwater Quality

Dear Dan:

To confirm our telephone conversation on Friday (3/12/82, 3:30 P.M.), I would like to mention the subjects discussed.

#4 Well, whether it was abandoned, capped, sealed, amount of Mercury in the water, gasoline seepage from the old Petes' Getty Gas Station and is it being used. The Well is off line, however, I pump it overboard to keep it fresh, just in case of an emergency, such as a fire. A new chlorine booster pump will be installed in the next few weeks.

#5 Well, that it is supposed to be a marginal well and only used in an emergency because the Mercury Tests years back showed 1.5 ppb, still under the E.P.A. standard of 2 ppb. The Well is now pulled for general maintenance and the repair work will be bidded within 2 weeks.

Groundwater Quality in New Jersey. An inspection of Toxic Contaminants, March 1981 by Robert K. Tucker, PhD.

I asked whether the laboratory tests performed in the aforementioned study reflected any serious problems with our wells and the statement given, that I could make to the M.M.U.A. at its meeting on Tuesday, March 16, 1982 is "The quality of our potable water shows no significant amount of pesticides, nothing to be alarmed over."

Mercury tests had been performed by Quality Control Laboratory 2/1/82 at #5 Well, Test Well on Avery Drive and #7 Well and the results were less than 0.002/mg/l at all three locations. Also the State may be down in the near future to perform an inspection.

Very truly yours,

Gustav Mihlebach

GM/cdf
cc: File

B28

May 77

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

TABULATION OF ANALYTICAL DATA FROM PUBLIC WATER SUPPLY

Supply MONROE MUNICIPAL UTILITIES AUTHORITY County GLOUCESTER

Municipality MONROE TWP. Date Collected 3-23-82

Collected by Brian Kerr APR 26 1982 Memo # 82-67 Project # W-

BACTERIOLOGICAL ANALYSES: Coliform organisms determined by the membrane filter technique are reported in colonies per 100 ml. Chlorine residuals are reported in ppm.

Sample Number	Point of Collection	Coliform Organisms		Chlorine Residual	
		~~Fecal~~	~~Total~~	Free	Total
06384	WELL #6, LAKE AVE (RAW WATER)	9:45AM		0	0
06385	WELL #7, CORKERY LN.	10:20		↓	↓
06386	TEST WELL, AVERY DR.	11:00		↓	↓
06387	WELL #4 WASHINGTON ST.	11:40 AM		↓	↓

PHYSICAL – CHEMICAL ANALYSES: Determinations are in ppm except color, odor, turbidity, and pH. Figures in parentheses are from the N. J. Potable Water Standards and/or National Interim Primary Regulations.

Sample Number			06384	Sample Number	06385	06386	06387
Color (10)				Arsenic (0.05)			
Odor (III)				Barium (1.0)			
Turbidity (5)				Cadmium (0.010)			
pH				Chromium^{+6} (0.05)			
Alkalinity to pH 4				Copper (1.0)			
Nitrate as NO_3 (45)				Cyanide (0.20)			
Chloride (250)				Lead (0.05)			
Total Dis. Solids (500)			✓0.0007	Mercury (0.002)	✓0.0005 K	✓0.0012	* ✓0.0044
ABS/LAS (0.5)				Selenium (0.01)			
Total Hardness (150)				Silver (0.05)			
Total Iron (0.3)				Phenol (0.001)			
Manganese (0.05)				Endrin (0.0002)			
Sodium (50)				Lindane (0.004)			
Sulphate (250)				Methoxychlor (0.1)		REPORT SUBMITTED	
Fluoride (2.0)				Toxaphene (0.005)		APR 20 1982	
Zinc (5.0)				2.4-D (0.1)			
				Silvex (0.01)		NJDOH Environmental Chemistry Laboratory	

Remarks WELL #5 OUT OF SERVICE AT TIME OF SAMPLING
WELL #4 PUMPED TO WASTE 2 HRS PRIOR TO SAMPLING

* Exceeds standard

Ref file

Form VST-001
7/81

STATE OF NEW JERSEY
Department of Environmental Protection
Water Analysis

CHAIN OF CUSTODY

PLEASE TYPE OR PRINT WITH BALLPOINT PEN

MUNICIPALITY Monroe	COUNTY Gloucester	STREAM Grenadier
FACILITY Glassboro	LOCATION Rte 322 & Washington St	
REPRESENTATIVE	TITLE	COLL. NAME Reckard

REMARKS Found standing water in of storm outlet from ... overflow

BACT. LAB NO. ______
DATE REC'D. ______
BOTTLE NO. 14644
DATE REC'D ______
STORET ENT. ______ READ ______

Station Identification Number	YR. MO. DAY	HOUR	Sample No.
S C ,	820602	1355	(1) P 8 ,

FIELD ANALYSIS

- ☐ Water Temp. °C. (2) P00010,
- ☐ D.O. - Winkler (3) P00300,
- ☐ D.O. - Probe (4) P00299,
- ☐ pH (Field) (5) P00400,
- ☐ Sample Depth-ft. (6) P00003,
- ☐ Stream Flow-CFS (7) P00061,
- ☐ Gage Height-ft. (8) P00065,
- ☐ Spec. Cond. @ 25°C (9) P00095,
- ☐ Salinity ⁰/oo (10) P00480,
- ☐ Tide Stage (11) P70211,

CONDITION CODES

- ☐ Weather Conditions (12) P00041,
- ☐ Flow Severity (13) P01351,
- ☐ ______ Severity (14) P013__,
- ☐ ______ Severity (15) P013__,

NUTRIENTS

LEVEL ☐ HIGH ☐ LOW

- NO2 - N (16) P00615,
- NO2 + NO3 - N (17) P00630,
- NH3 - N (18) P00610,
- Tot. Kjeldahl N (19) P00625,
- P ☐ (20) P70507,
- PO4 ☐ (21) P00660,
- Phosphorus- ☐ (22) P00665,
- PO4 ☐ (23) P00650,

BACTERIOLOGICAL - DILUTIONS (REQUESTED)

Fecal Coliform / Total Coliform: 10 | 1 | 10⁻¹ | 10⁻² | 10⁻³ | 10⁻⁴ | 10⁻⁵ | 10⁻⁶

Fecal Streptococci: 10 | 1 | 10⁻¹ | 10⁻² | 10⁻³ | 10⁻⁴ | 10⁻⁵ | 10⁻⁶

- Fecal coli #100 ml ☐ MPN (24) P31615, ☐ MF (25) P31613,
- ☐ Fecal Strept MPN/100ml (26) P31677,
- ☐ Tot coli MPN/100 ml (27) P31505,

BIOCHEMICAL OXYGEN DEMAND

INITIAL D.O. (lab.) ______ SAMPLE

SEED YES ☐ NO ☐

CONC. %

BOD __

- ☐ BOD 5-DAY (28) P310, 6-DAY (29) P312,
- ☐ COD (30) P340,
- ☐ TOC (31) P00680,
- ☐ Color Pt - Cou (32) P00080,
- ☐ Turbidity (33) P00076,
- ☐ Suspended Solids (34) P00530,
- ☐ Suspended Solids Ash (35) P00540,
- ☐ Tot. Solids (36) P00500,
- ☐ Tot. Solids - Ash (37) P00510,
- ☐ Tot. Dissolved Solids (TDS) (38) P70300,

(Lab)

- ☐ pH (LAB) (39) P00403,
- ☐ Alkalinity as CaCO3 (40) P00410,
- ☐ Min. Acidity as CaCO3 (41) P00436,
- ☐ Chloride (42) P00940,
- ☐ MBAS (43) P38260,
- ☐ Phenols (44) P32730,
- ☐ Hardness - tot as CaCO3 (45) P00900,
- ☐ Sulfate (46) P00945,
- ☐ Oil & Grease (47) P00556,
- ☐ Petroleum Hydrocarbons (48) P45501,
- ☐ Cyanide (49) P00720,
- ☐ As - tot ug/l (50) P01002,
- ☐ Cd - tot ug/l (51) P01027,
- ☐ Cr - tot ug/l (52) P01034,
- ☐ Cu - tot ug/l (53) P01042,
- ☐ Fe - tot ug/l (54) P01045,
- ☑ Hg - tot ug/l (55) P71900, .5K
- ☐ Mn - tot ug/l (56) P01055,
- ☐ Ni - tot ug/l (57) P01067,
- ☐ Pb - tot ug/l (58) P01051,
- ☐ Zn - tot ug/l (59) P01092,

ADDITIONAL ANALYSIS

- ☐ ______ P______,
- ☐ ______ P______,
- ☐ ______ P______,
- ☐ ______ P______,
- ☐ ______ P______,

RESULTS mg/l unless otherwise noted

Chemist Review ______

Part 1 (White) - Water Quality Inventory Copy
Part 2 (Canary) - Laboratory Copy
Part 3 (Pink) - Laboratory Copy
Part 4 (Goldenrod) - Field Samplers Copy

STORM SEWER CONTAMINATION

B3c

Form DWR-143
7/81

NEW

DEPARTMENT OF ENVIRONMENTAL P CTION
DIVISION OF WATER RESOURCES
ENFORCEMENT & REGULATORY SERVICES

1982

COMPLIANCE EVALUATION INSPECTION
PUBLIC COMMUNITY WATER SUPPLY

DATE 5/4/82

GENERAL INFORMATION	
PURVEYOR/ FACILITY MONROE MUNICIPAL UTILITIES AUTHORITY	
FILE LOCATION MONROE TWP	PW-ID # 6811002
MAILING ADDRESS 374 So. MAIN STREET	
ADMIN. MR J.V. DINOVI CHAIRMAN	REQUIRED LICENSES T 2 W 2
BUSINESS TELEPHONE # Admin.: 609-629-4400 Licensed Operators: T 2	GUSTAV MINCEBACK W 2

FACILITY DESCRIPTION

SOURCES: descriptions, locations, capacities(mgd): WASHINGTON AVE #4. -0.72 mgd (for emergency use, presently the well is offline.) Water Street Well #5 - 0.91 mgd. Lebe Ave Well #6 - 0.6. Carbery Lane Well #7 - 1.14 mgd.

Est Tot Eff Cap: 3.27

TREATMENT: source, type, capacities(mgd): Wells 4,5 & 6 Chlorination (Gas) and PH adjustment with Caustic Soda. Well #7 Chlorination (Gas) and PH adjustment with Lime.

Est Tot Eff Cap: 3.27

FINISHED WATER STORAGE: descriptions, locations, capacities(mg): Chestnut and Water St elevated tank 0.15 mg Herbert Blvd elevated tank 0.30 mg; Carbery Lane & Black Horse Pike elevated tank 1.0

Est Tot Cap: 1.45

EMERGENCY INTERCONNECTIONS: descriptions, available gallonage(mgd): none

Est Tot Avail: —

AUXILIARY POWER: location, type, capabilities: Well #4 gasoline engine direct drive, Well #5 diesel engine, direct drive, Well #7 diesel generator for well & treatment.

Total 2.67

B31

NJDEP - DIVISION OF WATER RESOURCES
PUBLIC COMMUNITY WATER SUPPLY INSPECTION

DELIVERY INFORMATION

PLANT DELIVERED WATER (mgd,month,year) Max 36.521 mgd 7/81 Min 23.120 mgd 2/81 Annual Average 27.029

BULK PURCHASES (provider,mgd) none

BULK SALES (customer, mgd) none

NUMBER OF SERVICES 3500 % METERED 100

MUNICIPALITIES SERVED (est. services in each) Williamstown Monroe Twp

TOTAL ESTIMATED POPULATION SERVICED 9400

CURRENT/RECENT WATER RESTRICTIONS none

NEW CONSTRUCTION (Project Numbers) none

DISTRIBUTION MAINS: Sizing 4 (min) to 12 (max)
Pressures 40 (min) to 45 (max)
Hydrants/Flushing Program Semi-Annual

MONITORING & REPORTING

PARAMETER(S)	FREQUENCY REQUIRED	FREQUENCY PERFORMED
Coliform	10 per month	10 per month
Inorganics	1/3 yr	1/3 yr
Nitrate	1/3 yr	1/3 yr
Trihalomethanes	N/A	N/A
Organics	N/A	N/A
Turbidity	N/A	N/A
RADIOLOGICAL	1/4 yr	1/4 yr

NAME OF LABORATORY Quality Control Lab CERTIFICATION # 04002

ADDRESS 243 White Horse Pike Audubon NJ

COMPLIANCE EVALUATION

SOURCE DEFICIENCIES Well #4 Mercury in water Adjacent to Hurline Station. Well #5 not in operation. Out for general maintenance and repair the mercury contamination below EPA Standard and MCL established by the Safe Drinking Water Act

TREATMENT DEFICIENCIES none

B32

NJDEP - DIVISION OF WATER RESOURCE
PUBLIC COMMUNITY WATER SUPPLY INSPECTION

COMPLIANCE EVALUATION (Continued)

STORAGE AND/OR DISTRIBUTION DEFICIENCIES Distribution system contains undersized mains

LICENSING, MONITORING AND/OR REPORTING DEFICIENCIES None

COMPLIANCE SAMPLING VIOLATIONS :

LOCATION	DATA SOURCE	PARAM	MAX CONTMNT LEVEL	RESULT	LOCATION	DATA SOURCE	PARAM	MAX CONTMNT LEVEL	RESULT

OVERALL COMPLIANCE RATING:

☒ ACCEPTABLE ☐ CONDITIONALLY ACCEPTABLE ☐ UNACCEPTABLE

NOTICE: YOU ARE REQUIRED TO INFORM THE N.J.D.E.P. IN WRITING OF YOUR ACTUAL OR INTENDED ACTIONS TO COMPLY WITH N.J.S.A. 58:12A-1 ET SEQ. VIA IMPLEMENTATION OF REMEDIAL MEASURES TO CORRECT THE DEFICIENCIES LISTED IN THIS REPORT. FAILURE TO ADEQUATELY RESPOND IN A TIMELY FASHION WILL RENDER YOU LIABLE FOR PENALTIES OF UP TO $5,000.00 FOR EACH VIOLATION, PURSUANT TO N.J.A.C. 7:10-3.

INSPECTOR: RJ Ruccianti
Signature

RJ Ruccianti
Name

FCI
Title

VI
Region

PERSON INTERVIEWED: G. Millback
Name

Supt
Title

Monroe Municipal Utilities
Organization

L4840 1482

NEW JERSEY ST. DEPARTMENT OF ENVIRONMENTAL PROTECTION

TABULATION OF ANALYTICAL DATA FROM PUBLIC WATER SUPPLY

Allamuchy — County Gloucester

Monroe Twp — Date Collected 6/2/82

Beecraiche Region WT — Memo # _____ Project # W- _____

LOGICAL ANALYSES: Coliform organisms determined by the membrane filter technique are reported in colonies per 100 ml. Chlorine residuals are reported in ppm.

Number	Point of Collection	Coliform Organisms		Chlorine Residual	
		~~Fecal~~	Total	Free	Total
0	Well #6 Lake Ave	1 36 PA			
42	Well #5 Water St	2 PA			

– CHEMICAL ANALYSES: Determinations are in ppm except color, odor, turbidity, and pH. Figures in parentheses are from the N. J. Potable Water Standards and/or National Interim Primary Regulations.

mber	14640			Sample Number	14640	14642	
(10)				Arsenic (0.05)			
(III)				Barium (1.0)			
(5)				Cadmium (0.010)			
				Chromium^{+6} (0.05)			
pH 4				Copper (1.0)			
O_3 (45)				Cyanide (0.20)			
(250)				Lead (0.05)			
olids (500)				Mercury (0.002)	<0.0005K	0.0005K	
(0.5)				Selenium (0.01)			
ness (150)				Silver (0.05)			
(0.3)				Phenol (0.001)			
(0.05)				Endrin (0.0002)			
(50)				Lindane (0.004)			
(250)				Methoxychlor (0.1)			
(2.0)				Toxaphene (0.005)			
(5.0)				2.4-D (0.1)			
				Silvex (0.01)			

RECEIVED
JUN 25 1982
STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF POTABLE WATER

REPORT SUBMITTED
JUN 16 1982

Copy to Allamuchy Twp

NJDOH Environmental Chemistry Laboratory

SHEET 1 — BUREAU OF POTABLE WATER

B34

Quality Control Laboratory and Environmental Support Alliance

243 White Horse Pike
Audubon, New Jersey 08106
"Certified Test[illegible]oratory"
DEP L[illegible]04002
609-428-1303 609-296-797[illegible]

Information
Analysis # A 958

Date rec'd at lab 4/14/83 T _____

By _____

Date rec'd by Tech. _____ T _____

By _____

Date analyses started _____ T _____

Date analyses comp. _____ T _____

Customer Information

Co. Monroe M.U.A.

Address _____ Phone _____

Sample drawn by Gus M Date 4/14/83 Time 1 P.M.

From #5 Well

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides				
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury	less than .002mg/l			
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Coliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

Remarks _____

B 35

Bruce Greenwald, Lab Mgr.

Quality Control Laboratory and Environmental Support Alliance

243 White Horse Pike
Audubon, New Jersey 08106

"Certified Test Laboratory"
DEP Lab. ID# 04002

609-428-1303 609-296-7970

Information
Analysis # A 957
Date rec'd at lab 4/14/83 T _____
By _____
Date rec'd by Tech. _____ T _____
By _____
Date analyses started _____ T _____
Date analyses comp. _____ T _____

Customer Information

Co. Monroe M.U.A. Potable Water

Address _____ Phone _____

Sample drawn by Gus M Date 4/14/83 Time 1 P.M.

From #4 well

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides				
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury	.0046mg/l			
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Coliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

Remarks _____

B-36

Bruce Greenwald, Lab Mgr.

Water Supply Purveyor Monroe Municipal Utilities Authority Date March 20, 1980

14. Deficiencies noted:

Source 1. Well # 4-well blow-off is not protected against entry of pollution. Underground gasoline storage tank is located within 100 ft. of well. 2. Well # 4-past Brueau records indicates raw water from this well contains mercury in excess of the MCL established by the Safe Drinking Water Act.

Treatment -

Storage and Distribution 1. Distribution system contains undersized mains.

Other

15. Sampling: Dates/Comments 3/20/80 microbiological analysis was satisfactory. Limited chemical analysis showed the finished water from Well # 7 to be corrosive. Langelier Index=-2.0

16.

Adequacy of facilities	Excellent	[ ]	Good	[x]	Fair	[ ]	Poor	[ ]	Unsatisfactory [ ]
Condition of facilities	Excellent	[x]	Good	[ ]	Fair	[ ]	Poor	[ ]	Unsatisfactory [ ]
Operation of facilities	Excellent	[x]	Good	[ ]	Fair	[ ]	Poor	[ ]	Unsatisfactory [ ]

Specific Comments

Operator's Reports Satisfactory

17. Immediate Requirements* 1. Use Well # 4 in an emergency only. 2. Use Well # 5 only when necessary to meet daily water demands. 3. Adjust pH of finished water from Well # 7 to render water less corrosive

18. General Recommendations 1. Maintain surveillance to detect leakage of gasoline into Well # 4. 2. Gradually replace undersized mains smaller than 6 in. pipe diameter.

NOTE: Kindly inform this Department of your actions relative to implementation of item 17 within 14 days of receipt.

Inspected: Daniel S. Mozer — Signature — 5/9/80 — Date

DSM:el Daniel S. Mozer — Name

Senior Environmental Engineer — Title

Reviewed: William J. Laffey — Signature

William J. Laffey — Name

Supervising Environmental Engineer — Title

B25

JUN 20 1984

Monroe Township M.U.A.
372 South Main Street
Williamstown, New Jersey 08094

RE: Monitoring for Mercury
P.W. - ID No.: 0811002
Monroe Township/Gloucester County

Gentlemen:

The Department's records of Well #4 indicates that the raw water from this well contains mercury in excess of the MCL established by the Safe Drinking Water Act. It is known that Well #4 is used for emergency only, however you are directed to maintain a monthly surveillance of Well #4 and the test well on Avery Drive for mercury. This monitoring is to be reported to this Department along with the monthly operators reports.

If you have any questions concerning the above, please contact Al Anderson, the Compliance Investigator responsible for this case, who can be reached at (609) 292-1924 or by letter through this Division.

Thank you for your cooperation.

Very truly yours,

Original signed & mailed

Nick DeMeo
Supervising Environmental
Compliance Investigator
Southern Region
Enforcement Element

ASl:ral
cc: George Cossaboon, Licensed Operator
Bureau of Potable Water
Robert Williams, USEPA - Region II
bcc: Region File THROUGH: DeMeo & Ricciardi
Central File
Al Anderson
Marianne Montgomery

Quality Control Laboratory an[illegible]nvironmental Support Alliance
243 White Horse Pike "Certified [illegible] Laboratory"
Audubon, New Jersey 08106 [illegible]b. ID# 04002 609-428-1303 609-296[illegible]

Lab. Information
Analysis # D 695
Date rec'd at lab 11/26/84 T 1:45PM
By
Date rec'd by Tech. T
By
Date analyses started T
Date analyses comp. T

Customer Information

Co. Monroe M.U.A

Address Phone

Sample drawn by B.G. Date 11/26/84 Time 11:33 A.M.

From Washington Ave. Well #4

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides				
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury	.00295	mg/l		
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Coliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

Remarks

B-38

Bruce Greenwald, Lab Mgr.

Quality Control Laboratory and Environmental Support Alliance
243 White Horse Pike "Certified Drinking Water Laboratory"
Audubon, New Jersey 08106 Lab. ID# 04002 609-428-1303 609-29[redacted]0

Lab. Information
Analysis # D 1797
Date rec'd at lab 12/17/84 T 1:10PM
By
Date rec'd by Tech. T
By
Date analyses started T
Date analyses comp. T

Customer Information

Co. Monroe M.U.A.

Address Williamstown, N.J. Phone

Sample drawn by B.G. Date 12/17/84 Time 11:12 A.M.

From Washington Ave. Well #4

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides				
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury	0.0015mg/l			
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

RECEIVED
FEB 8 - 1985
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF POTABLE WATER

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Coliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

Remarks

B-39

Bruce Greenwald, Lab Mgr

Quality Control Laboratory and Environmental Support Alliance

243 White Horse Pike
Audubon, New Jersey 08106
"Certified T... aboratory"
DE... ID# 04002
609-428-1303 609-296-...

Lab. Information
Analysis # D 2320

Date rec'd at lab 1/24/85 T 2:30PM

By

Date rec'd by Tech. T

By

Date analyses started T

Date analyses comp. T

Customer Information

Co. Monroe M.U.A.

Address Wiliamstown, N.J. Phone

Sample drawn by B.G. Date 1/24/85 Time 1:51 P.M.

From Washington Ave. (Well)

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides				
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury	.0029mg/1			
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

RECEIVED
FEB 8 - 1985
N.J. STATE DEPT. OF ENVIRONMENTAL PROTECTION
BUREAU OF POTABLE WATER

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Colliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

Remarks

B-40

Bruce Greenwald, Lab Mgr.

Quality Control Laboratory an nv nmental Support Alliance
243 White Horse Pike "Certified Laboratory"
Audubon, New Jersey 08106 D o. ID# 04002 609-428-1303 609-296

Lab rmation E 9045
Ana. #

Date rec'd at lab 12/19/85 T 2:50pm

By

Date rec'd by Tech. T

By

Date analyses started T

Date analyses comp. T

Customer Information

Co. Monroe Township MUA

Address Williamstown,N.J. Phone

Sample drawn by A.L. Date 12/19/85 Time 1:39pm

From Well #4 - Washington Ave.

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides				
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury	.00177mg/1			
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Rec	Date/Time
T. Cells					
T. Collform					1936

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

RECEIVED

Remarks

N.J. State Dept. of Environmental Protection
BUREAU OF POTABLE WATER

B-41

Bruce Greenwald, Lab Mgr

Form DWR-143
7/81

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
ENFORCEMENT & REGULATORY SERVICES

BK

COMPLIANCE EVALUATION INSPECTION
PUBLIC COMMUNITY WATER SUPPLY

DATE June 27, 1985

GENERAL INFORMATION

PURVEYOR/FACILITY: Monroe Township, M.U.A.

FILE LOCATION: Monroe Twp. / Gloucester Co. | PW-ID #: 0811002

MAILING ADDRESS: 372 South Main Street, Williamstown, N.J.

ADMIN.: MS Jacqueline Schoewewald | REQUIRED LICENSES: T-3, W-3 Goode

BUSINESS TELEPHONE # Admin.: 629-7586 Licensed Operators: T-3 C-3 W-4 M. Cossabone

FACILITY DESCRIPTION

SOURCES: descriptions, locations, capacities(mgd): Well #4 Washington Ave 0.72 mgd; Well #5 Water St. 0.81 mgd; Well #6 Lake Ave 0.60 mgd; Well #7 Corkery Lane 1.14 mgd.

Well #4 emergency use only Est Tot Eff Cap: 3.27 mgd

TREATMENT: source, type, capacities(mgd): Gas chlorination at all wells. Wells 4, 5 & 6 PH adjusted with Caustic Soda, Well #7 PH adjusted with lime.

Est Tot Eff Cap: 3.27 mgd

FINISHED WATER STORAGE: descriptions, locations, capacities(mg): Elevated Tank - Water St. 0.15 mg; Elevated Tank - Herbert Boulevard 0.30 mg; Elevated Tank - Corkery Lane 1.0 mg.

Est Tot Cap: 1.45 mg

EMERGENCY INTERCONNECTIONS: descriptions, available gallonage(mgd): None

Est Tot Avail: ____

AUXILIARY POWER: location, type, capabilities: Well #5 (Right angle Drive) diesel engine/generator for well and Treatment - 50 Kw - 0.81 mgd; Well #7 diesel engine/generator for well and Treatment - 10.0 Kw - 1.14 mgd. Tot. Aux. Cap 1.95 mgd

B-42

NJDEP · DIVISION OF WATER RESOURCE
PUBLIC COMMUNITY WATER SUPPLY INSPECTION

COMPLIANCE EVALUATION (Continued)

STORAGE AND/OR DISTRIBUTION DEFICIENCIES None

LICENSING, MONITORING AND/OR REPORTING DEFICIENCIES : None

COMPLIANCE SAMPLING VIOLATIONS :

LOCATION	DATA SOURCE	PARAM	MAX CONTMNT LEVEL	RESULT	LOCATION	DATA SOURCE	PARAM	MAX CONTMNT LEVEL	RESULT

OVERALL COMPLIANCE RATING:

☑ ACCEPTABLE ☐ CONDITIONALLY ACCEPTABLE ☐ UNACCEPTABLE

NOTICE: YOU ARE REQUIRED TO INFORM THE N.J.D.E.P. IN WRITING OF YOUR ACTUAL OR INTENDED ACTIONS TO COMPLY WITH N.J.S.A. 58:12A-1 ET SEQ. VIA IMPLEMENTATION OF REMEDIAL MEASURES TO CORRECT THE DEFICIENCIES LISTED IN THIS REPORT. FAILURE TO ADEQUATELY RESPOND IN A TIMELY FASHION WILL RENDER YOU LIABLE FOR PENALTIES OF UP TO $5,000.00 FOR EACH VIOLATION, PURSUANT TO N.J.A.C. 7:10-3.

INSPECTOR: Joseph C. Kane
Signature
Joseph C. Kane
Name
Env. Comp. Insp.
Title
Southern
Region

PERSON INTERVIEWED: George Cossabone
Name
Operator
Title
Monroe Twp M.U.A.
Organization

NJDEP - DIVISION OF WATER RESOURCES
PUBLIC COMMUNITY WATER SUPPLY INSPECTION

DELIVERY INFORMATION

PLANT DELIVERED WATER (mgd,month,year) Max 1.194 June, 84 Min .815 Feb, 84 Annual Average .920 ,84

BULK PURCHASES (provider,mgd) None

BULK SALES (customer, mgd) None

NUMBER OF SERVICES 4400 % METERED 100

MUNICIPALITIES SERVED (est. services in each) All Services in Monroe Twp.

TOTAL ESTIMATED POPULATION SERVICED

CURRENT/RECENT WATER RESTRICTIONS Voluntary Conservation

NEW CONSTRUCTION (Project Numbers) None

DISTRIBUTION MAINS: Sizing 4" (min) to 10" (max)
Pressures 45 psi (min) to 65 psi (max)
Hydrants/Flushing Program Yrs / Yrs

MONITORING & REPORTING

PARAMETER(S)	FREQUENCY REQUIRED	FREQUENCY PERFORMED
PH & Cl_2	Daily	Daily
Coliform	15- month	15- month
Inorganics & NA	1- 3 years	1- 3 yrs 10-1-84
Nitrate	1- 3 years	1- 3 yrs
Trihalomethanes	4- 3 months	4-3 mo's 5-30-84
Organics	N/A	N/A
Turbidity	N/A	N/A
Radio	1- 4 years	1-4 yrs 6-24-83
A-280's	1- 6 mo's	1-6 mo's 5-30-84
Secondaries	1- 3 years	1-3 yrs 10-1-84

recently Completed /

NAME OF LABORATORY Quality Control CERTIFICATION # 04002

ADDRESS Audubon N.J.

COMPLIANCE EVALUATION

SOURCE DEFICIENCIES None

TREATMENT DEFICIENCIES None

Form DWR-143
7/81

NEW JEP DEPARTMENT OF ENVIRONMENTAL PP TION
DIVISION OF WATER RESOURCES
ENFORCEMENT & REGULATORY SERV S

COMPLIANCE EVALUATION INSPECTION
PUBLIC COMMUNITY WATER SUPPLY

1986

DATE MAY - 17-8

GENERAL INFORMATION

PURVEYOR/ FACILITY MONROE TWP MUA

FILE LOCATION MONROE TWP GLOUCESTER CO. | PW-ID # 0815002

MAILING ADDRESS 322 SOUTH MAIN ST, WILLIAMSTOWN NJ

ADMIN. MS. JACQUELINE SCHENWALD | REQUIRED LICENSES T - 3 W - 3

BUSINESS TELEPHONE # Admin.: 629-7556 Licensed Operators: T-3 T.E. CUSHMORE W-3 W.E. CUSHMORE

FACILITY DESCRIPTION

SOURCES: descriptions, locations, capacities(mgd): 4 WELLS WELL #4 WASHINGTON (EMERGENCY USE ONLY) AVE 0.72 MGD WELL #5 - WATER ST. 0.81 MGD. WELL #6 LAKE AVE 0.66 MGD WELL #7 MARKET LANE 1.14 MGD Est Tot Eff Cap: 3.27 MGD

TREATMENT: source, type, capacities(mgd): CL2 CHLORINATION AT ALL WELLS WELLS 4, 5 AND 6 PH ADJUSTMENT WITH SODA ASH. WELL #7 LIME ADJUSTMENT OF PH. Est Tot Eff Cap: 3.27 MGD

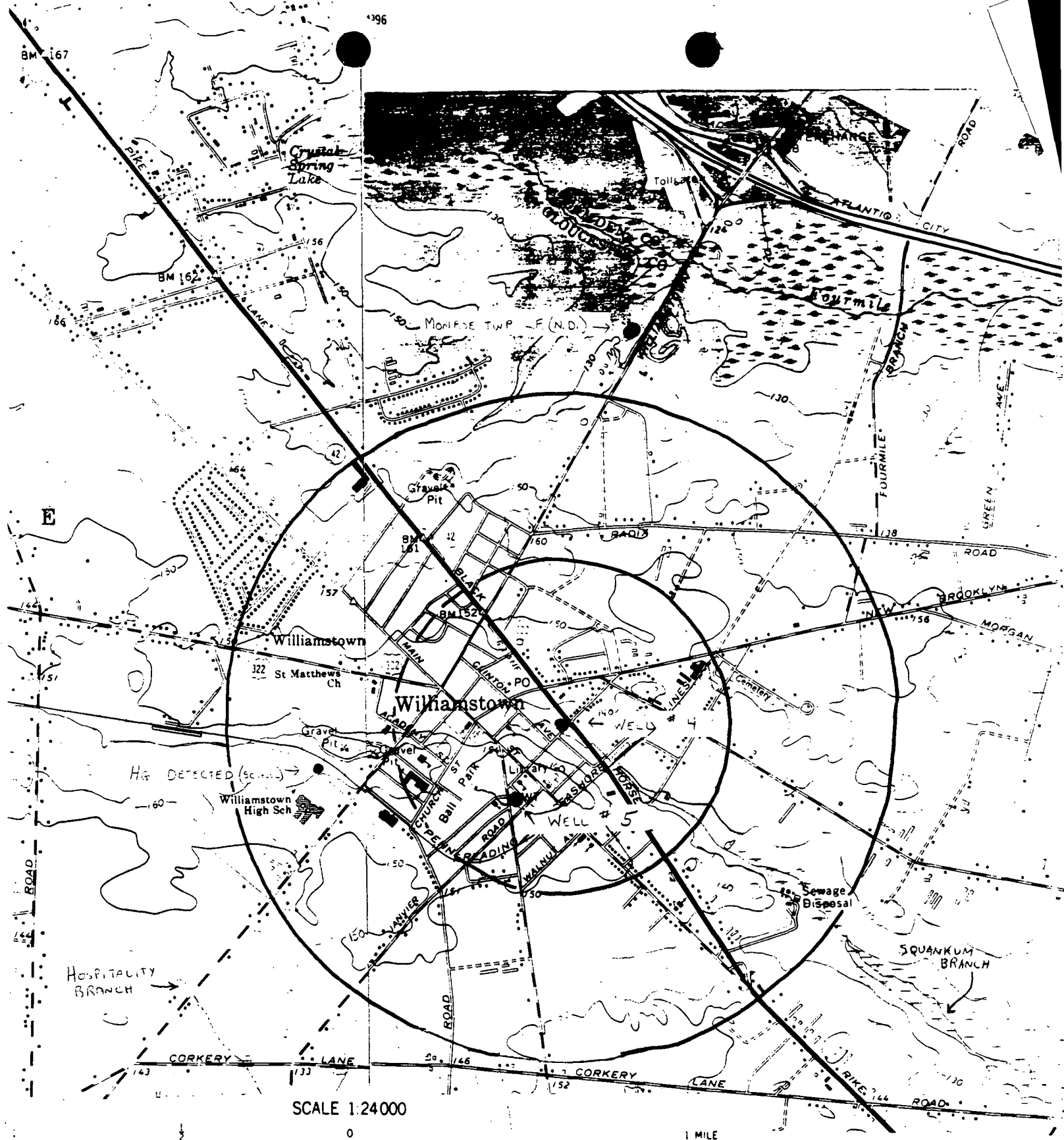
FINISHED WATER STORAGE: descriptions, locations, capacities(mg): ELEVATED STEEL WATER ST 0.75 MG ELEVATED TANK TREATMENT PLANT 0.5 MG ELEVATED TANK LOCATED WITHIN DIST. Est Tot Cap: 1.25 MG

EMERGENCY INTERCONNECTIONS: descriptions, available gallonage(mgd): NONE

Est Tot Avail: -

AUXILIARY POWER: location, type, capabilities: WELL #5 DIESEL NIGHT MINDER WITH SOURCE AND TREATMENT 0.81 MGD WELL #7 DIESEL GENERATOR SOURCE AND TREATMENT 1.14 MGD

B-45



LATITUDE : 39° 41' 03"

LONGITUDE : 74° 59' 25"

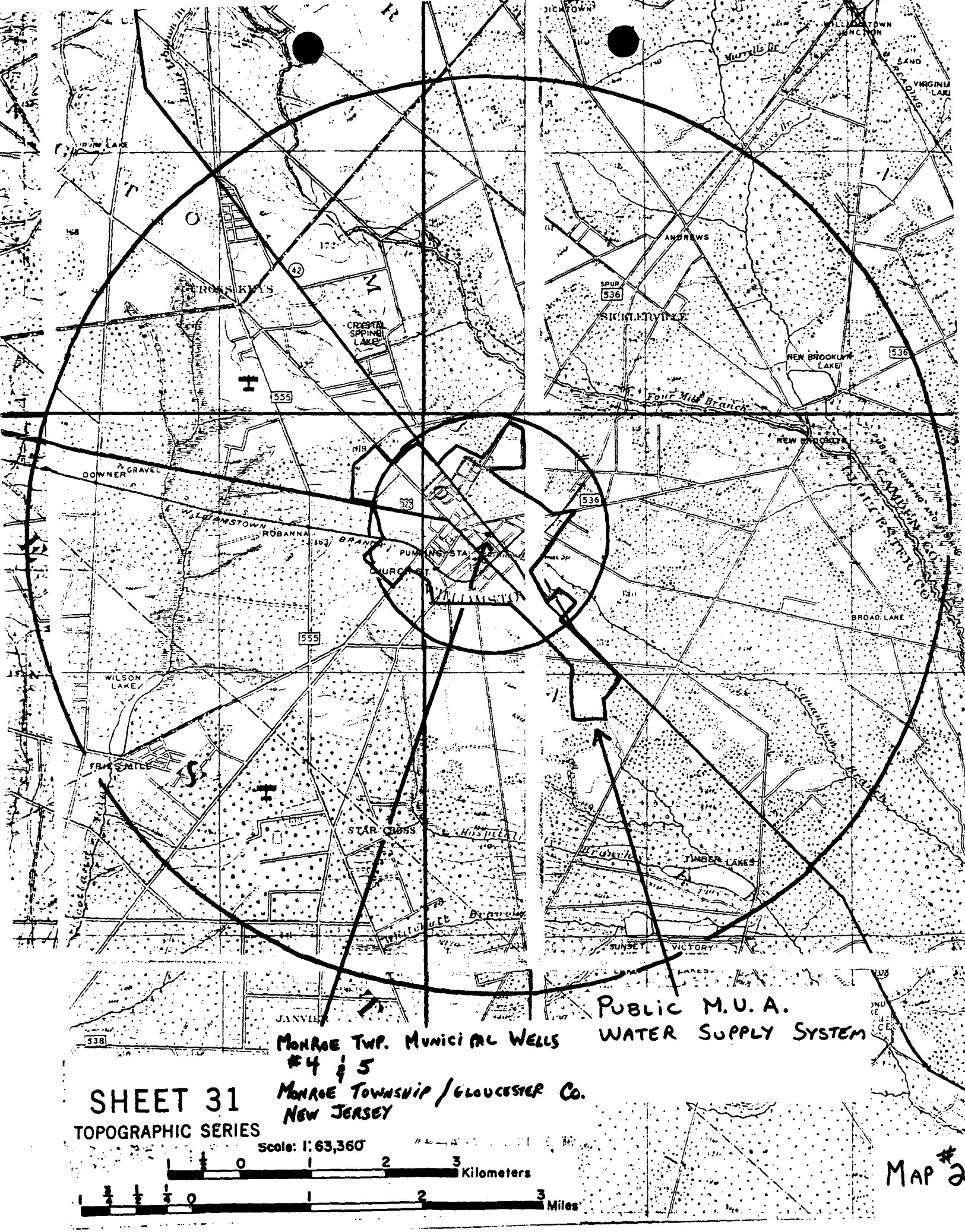
EPA ID # NJD980769679

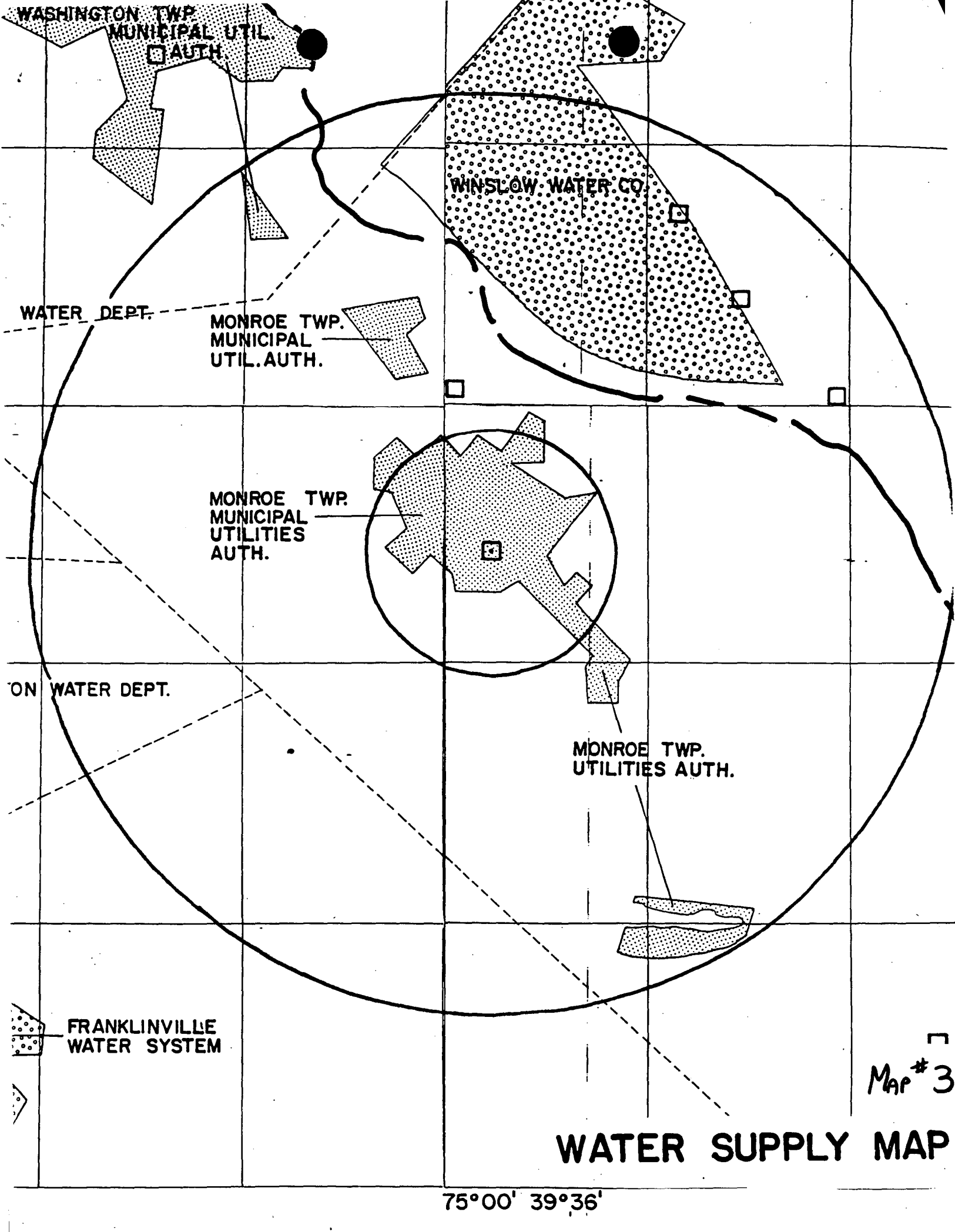
MONROE TWP MUNICIPAL WELLS
4 & # 5
MONROE TWP. / GLOUCESTER CO.
NEW JERSEY

MAP # 1

ITMAN EAST, N. J.
N3937.5—W7500/7.5
1966

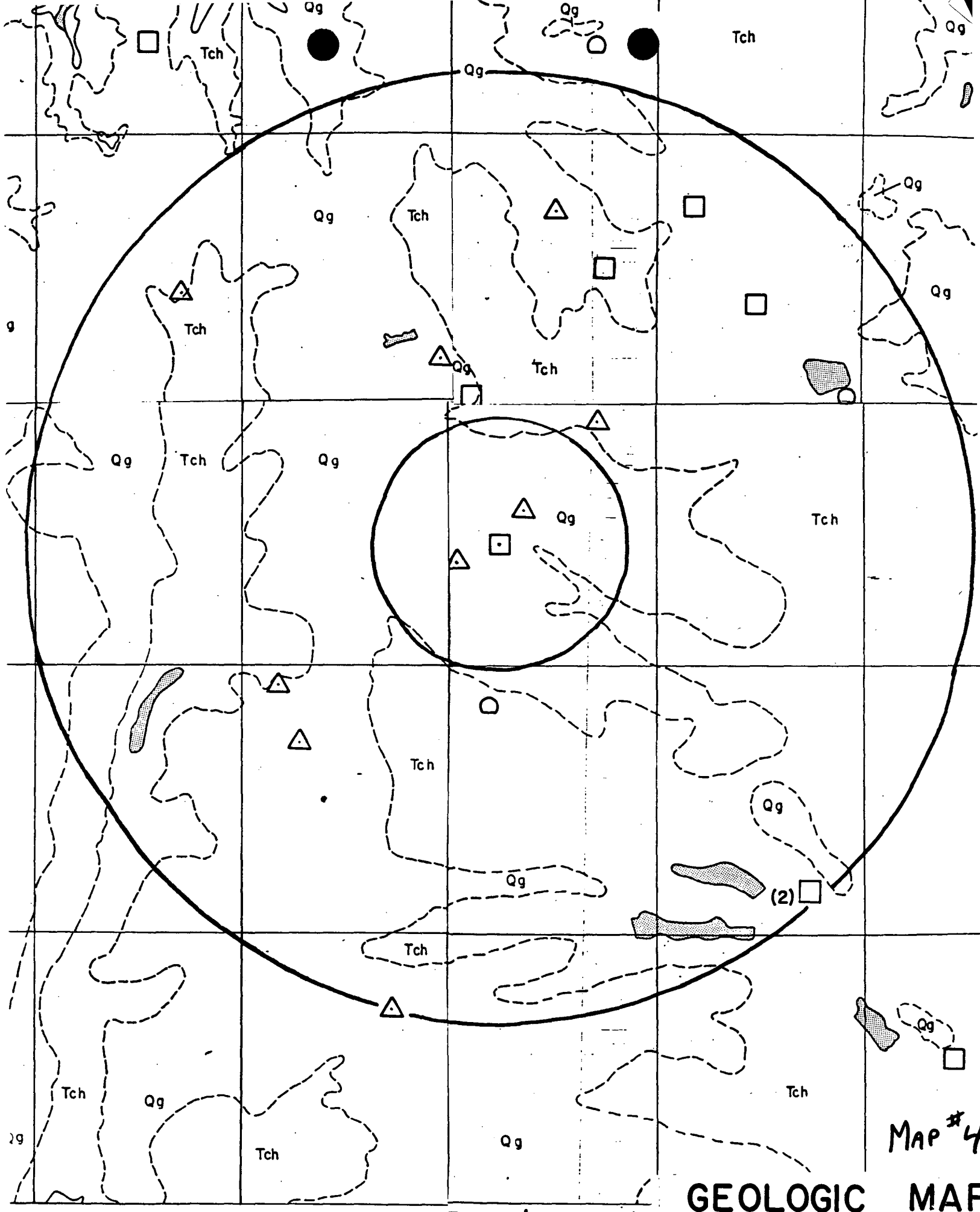
WILLIAMSTOWN, N.J.
NW/4 HAMMONTON 15 QUADRANGLE
N3937 5—W7452 5 7 5
1966


CROSS KEYS
CRYSTAL SPRING LAKE
ANDREWS
SPUR 536
SICKLERVILLE
NEW BROOKLYN LAKE
536
555
Four Mile Branch
DOWNER GRAVEL
WILLIAMSTOWN
ROBANNA
BRANCH
PUMPING STA.
CHURCH ST.
WILLIAMSTOWN
328
BROAD LANE
WILSON LAKE
FRIES MILL
STAR CROSS
Hospital
TIMBER LAKES
SUNSET
VICTORY
JANVIER
338
PUBLIC M.U.A.
WATER SUPPLY SYSTEM
MONROE TWP. MUNICIPAL WELLS
#4 & 5
MONROE TOWNSHIP / GLOUCESTER CO.
NEW JERSEY
SHEET 31
TOPOGRAPHIC SERIES
Scale: 1:63,360
0 1 2 3 Kilometers
1 ¾ ½ ¼ 0 1 2 3 Miles
MAP #2



Map #3

WATER SUPPLY MAP


Qg
Tch
(2)
Map #4
GEOLOGIC MAP
75°00'
39°36'
X=1906069.51

A. Pitman East, Runnemede

B. Atlantic Coastal-Great Egg Harbor River; Delaware Bay-Maurice River; Delaware River-Big Timber Creek, Mantua Creek

C. 2.

Map No.	Location	Period of Record
452	South Branch Big Timber Creek at Blackwood	1964-

Water Quality Standards: (explained in Atlas Sheet description)
FW3 except where classified FW1

D. Quaternary Gravels (Qg), Cohansey Formation (Tch), Kirkwood Sand (Tkw), Vincentown Sand (Tvt), Hornerstown Marl (Tht), Navesink Marl (Kns), Mount Laurel and Wenonah Formations (Kmw)

E. 1. Physiographic Province: Coastal Plain
Subdivision: Inner Plain, Outer Plain
Major Topographic Features: Clay and Marl Region, Pine Plains
Elevations (ft.above sea level): hills 180, valleys 10
Relief (ft.): 170

2. a. Normal Year: 46"
Dry Year: 34"
Wet Year: 52"

b. January: 33°F
July: 76°F

c. 249 days. Last killing frost: 4/25; first killing frost: 10/20

F. Div. of Fish, Game and Shellfisheries:
Glassboro Fish and Wildlife Management Area

4A

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
31-22-124	Deptford Twp.	1971	414-447	485	735	Kmr
31-22-129	Washington Twp.Mun.Util.Auth.	1972	369-417	460	440	"
31-22-212	Blackwood Water Co.	1956	426-447	513	708	"
31-22-223	Garden State Water Co.,#6	1971	410-480	505	1012	"
31-22-234	Gloucester Twp.Bd.of Ed.	1964	455-475	475	220	"
31-22-242	Garden State Water Co.	1974	433-475	544	1000	"
31-22-397	Gloucester Twp.Bd.of Ed.	1960	293-	315	80	Kns
31-22-433	Washington Twp.Mun.Util.Auth.	1972	575-640	659	1000	Kmr
31-22-459	" Bd.of Ed.	1970	230-260	260	270	Ket
31-22-486	Fred Smith	1967	250-300	305	500	"
31-22-516	Wash.Twp.Mun.Util.Auth.,#2	1967	542-576	597	503	Kmr
31-22-528	" #8	1968	544-620	667	735	"
31-22-538	" #1	1959	581-612	670	620	"
31-22-558	" #6	1964	584-652	760	858	"
31-22-724	Fred Smith	1966	20-45	65	60	Tch
31-22-783	"	1964	20-80	100	528	"
31-22-867	Joseph Frederessi	1971	50-80	80	200	"
31-22-996	Norman Tomasello	1964	80-100	100	596	"

J. Geodetic Control Survey monuments described in Index Maps 54,55,61

BLOCK #31-23 9/76

A. Clementon, Williamstown

B. Atlantic Coastal-Great Egg Harbor River, Atsion, Mechesac, Delaware River-Big Timber Creek

C. 2.

Map No.	Location	Period of Record
439	Great Egg Harbor at Berlin	1964-

Water Quality Standards: (explained in Atlas Sheet description)
FW2 except where classified FW3

D. Quaternary Gravel (Qg), Cohansey Sand (Tch), Kirkwood Sand (Tkw)

E. 1. Physiographic Province: Coastal Plain
Subdivision: Outer Plain
Major Topographic Features: Pine Plains
Elevations (ft.above sea level): hills 180, valleys 50
Relief (ft.): 130

2. a. Normal Year: 46"
Dry Year: 34"
Wet Year: 54"

b. January: 33°F
July: 75°F

c. 246 days. Last killing frost: 4/25; first killing frost: 10/15

F. Div. of Parks and Forestry:
Inskip State Park
Camden County:
New Brooklyn Park

4c

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
31-23-162	Pine Valley Golf Club	1955	-	267	200	Kmw
31-23-183	Pine Valley Water Co.	1960	31-86	105	100	Tch
31-23-235	Borough of Berlin, #10	1967	645-713	800	1012	Kmr
31-23-236	"	1952	310-360	398	450	Kmw
31-23-236	"	1955	650-713	955	1001	Kmr
31-23-344	" #11	1972	675-745	747	1078	"
31-23-347	Overbrook High School	1971	315-335	335	145	Tvt?
31-23-356	Owens-Illinois Glass Co.	1951	410-440	552	115	Kmw
31-23-367	Lower Camden Reg.High School	1957	100-110	170	240	Tkw
31-23-395	Ivystone Water Works	1963	420-460	460	528	Kmw
31-23-467	Lafferty & Sons	1959	61-82	113	201	Tch
31-23-538	Johns-Manville	1963	410-450	450	300	Kmw
31-23-538	"	1963	410-450	900	200	"
31-23-659	A.T.& T.	1966	120-130	209	150	Tkw
31-23-694	Joseph Parillo	1966	52-57	82	100	Tch
31-23-728	Joseph Volpa	1969	112-127	127	-	Tkw
X 31-23-764	**Levitt & Sons, Inc.**	1971	81-96	157	200	Tch
X 31-23-777	**Monroe Twp.Mun.Util.Auth.**	1970	111-145	166	412	Tkw
X 31-23-818	**Winslow Water Co.**	1971	64-90	136	1000	Tch
X 31-23-858	"	1971	72-103	119	1000	"
31-23-899	**USGS, New Brooklyn Test**	1960	-	2090	-	Wgn
31-23-965	Dan DeSilvo	1968	25-84	90	60	Tch
31-23-996	A. K. Brown, Jr.	1967	40-100	100	300	"

J. Geodetic Control Survey monuments described in Index Maps 55,61; adjacent Index Maps 54,62

BLOCK #31-32 9/76

A. Newfield, Pitman East

B. Atlantic Coastal-Great Egg Harbor River; Delaware Bay-Maurice River

C. Water Quality Standards: (explained in Atlas Sheet description)
FW1 except where classified FW3

D. Quaternary Gravel (Qg), Cohansey Sand (Tch)

E. 1. Physiographic Province: Coastal Plain
Subdivision: Outer Plain
Major Topographic Features: Pine Plains
Elevations (ft.above sea level): hills 150, valleys 90
Relief (ft.): 60

2. a. Normal Year: 47"
Dry Year: 33"
Wet Year: 53"

b. January: 35°F
July: 75°F

c. 249 days. Last killing frost: 4/25; first killing frost: 10/20

F. Div. of Fish, Game and Shellfisheries:
Glassboro Fish and Wildlife Management Area

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
31-32-174	Borough of Clayton, #4	1973	670-740	943	1043	Kmr
31-32-412	John Glover	1954	62-74	76	60	Tch
31-32-441	Borough of Clayton, #2	1956	745-800	1010	708	Kmr
X 31-32-612	Leshay Bros.	1965	19-141	141	1000	Tch-Tkw
X 31-32-619	Joseph Pagano	1966	40-180	180	60	" "
31-32-937	Albert B. Chard	1973	45-75	75	60	Tch

J. Geodetic Control Survey monuments described in
Index Maps 61,67

4E

BLOCK #31-33

A. Buena, Williamstown

B. Atlantic Coastal-Great Egg Harbor River, Nescochague;
Delaware Bay-Maurice River

C. Water Quality Standards: (explained in Atlas Sheet description)
FW2 except where classified FW3

D. Quaternary Gravel (Qg), Cohansey Sand (Tch)

E. 1. Physiographic Province: Coastal Plain
Subdivision: Outer Plain
Major Topographic Features: Pine Plains
Elevations (ft.above sea level): hills 140, valleys 70
Relief (ft.): 70

2. a. Normal Year: 47"
Dry Year: 34"
Wet Year: 56"

b. January: 34°F
July: 75°F

c. 248 days. Last killing frost: 4/25; first killing frost: 10/15

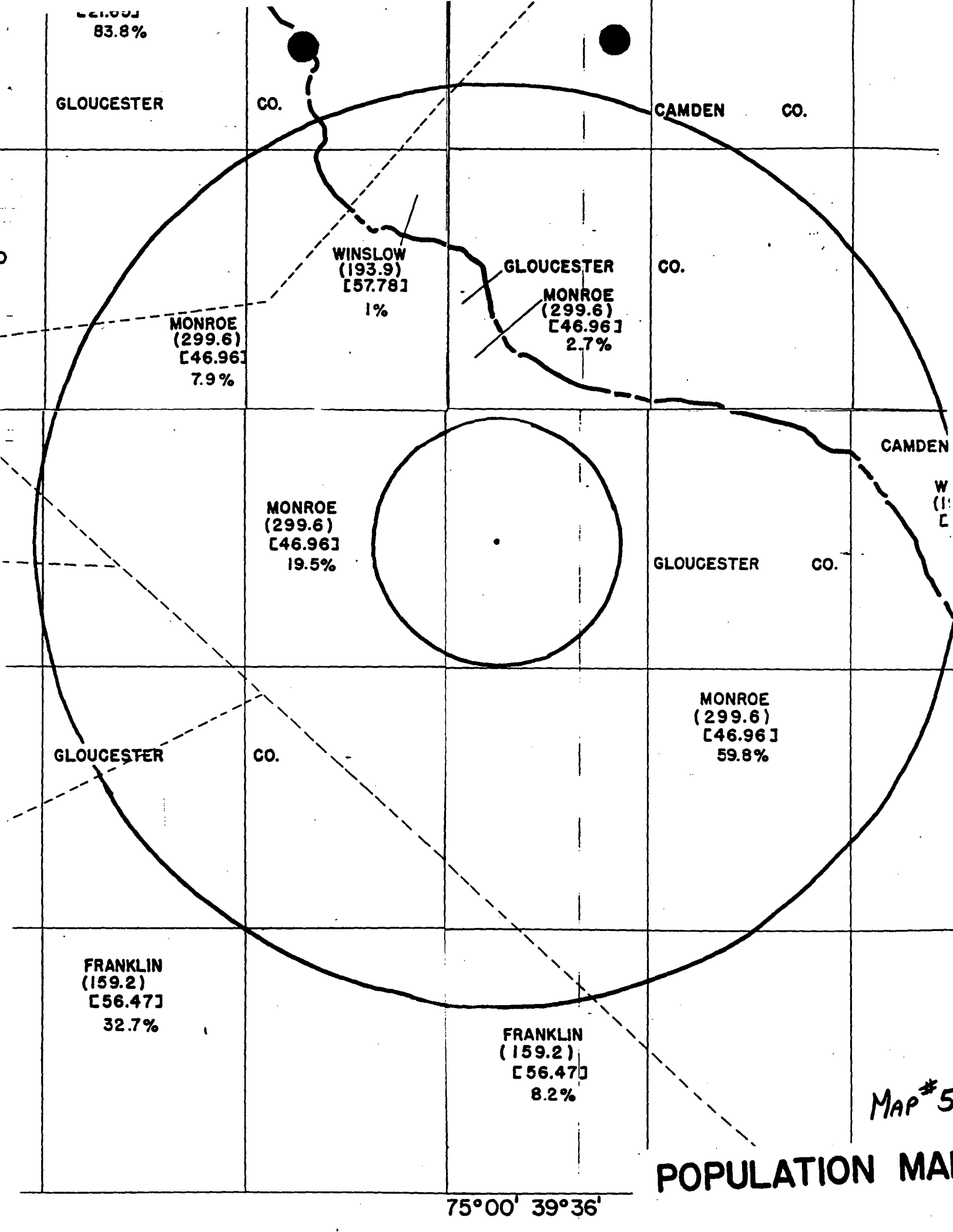
F. Div. of Parks and Forestry:
Inskip State Park
Div. of Fish, Game and Shellfisheries:
Winslow Fish and Wildlife Management Area

I. Water Well Records

	Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/m Yield	Formation
X	31-33-131	Frank Yegla	1972	40-80	80	50	Tch
X	31-33-146	Monroe Twp.Mun.Util.Auth.,#5	1967	127-160	180	510	"
X	31-33-147	Violet Packing Co.	1967	123-143	150	300	"
X	31-33-149	Monroe Twp.Mun.Util.Auth.,#4	1951	69-106	107	805	"
X	31-33-151	Decora Inc.	1974	105-120	120	250	"
X	31-33-[illegible]	[illegible] Bros.	1955	108-140	140	500	"
	31-33-594	American Mobile Home	1971	147-167	167	200	"
	31-33-594	"	1971	147-167	167	200	"
	31-33-954	Wharton Realty Co.	1962	56-82	97	100	"

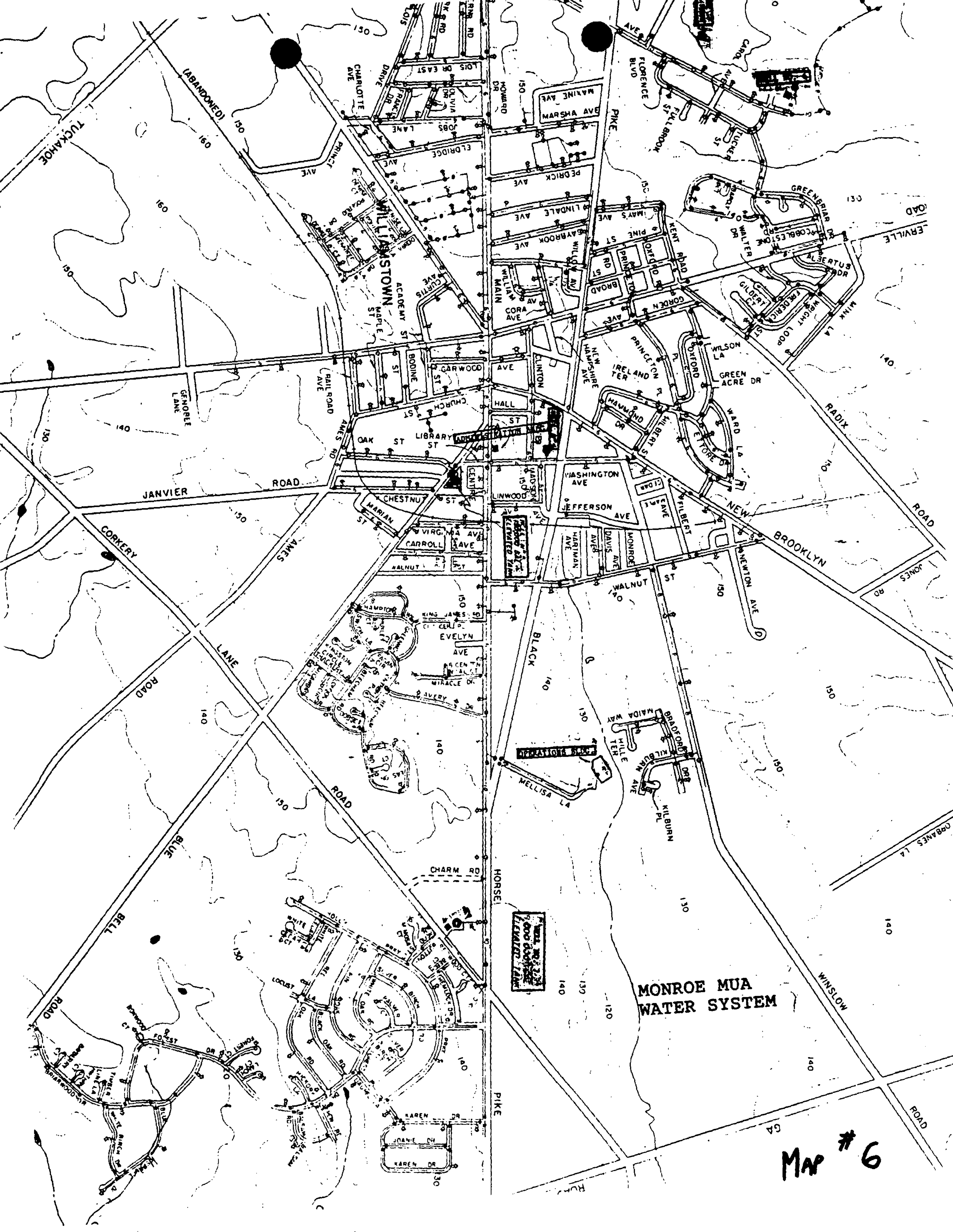
J. Geodetic Control Survey monuments described in
Index Maps 61,67; adjacent Index Maps 62,68

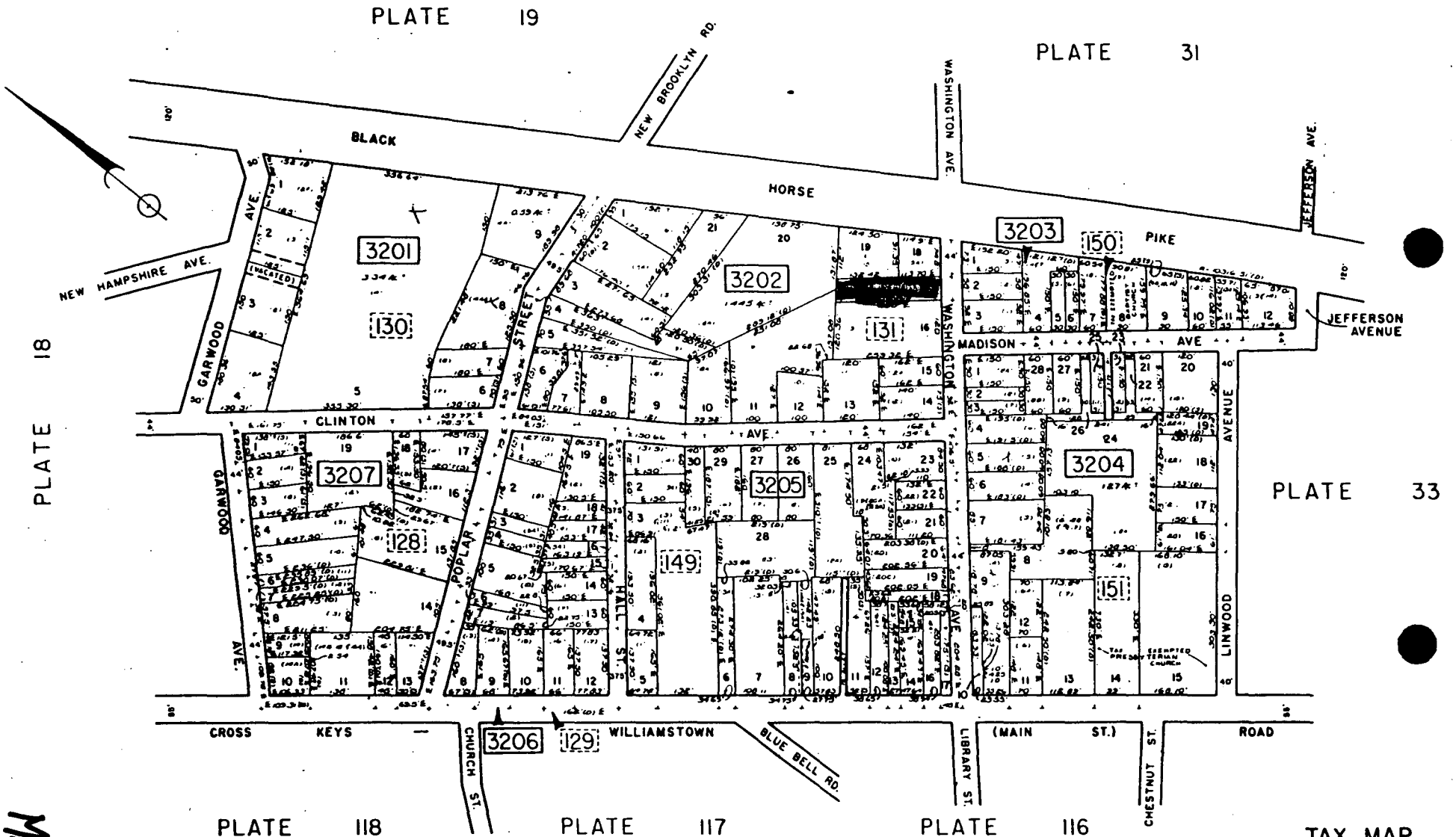
4F



MAP #5

POPULATION MA


MONROE MUA
WATER SYSTEM
WILLIAMSTOWN
TUCKAHOE
(ABANDONED)
PRINCE AVE
CHARLOTTE AVE
DRIVE
LOIS DR EAST
HOWARD DR
MAXINE AVE
MARSHA AVE
JOBS LANE
ELDRIDGE AVE
PEDRICK AVE
LINDALE AVE
SAYBROOK AVE
MAY'S AVE
PINE ST
KENT ROAD
FLORENCE BLVD
FULLBROOK ST
GREENBRIAR DR
COBBLESTONE RD
WALTER DR
ALBERTUS DR
GILBERT CT
FREDERICK ST
WRIGHT LOOP
MINK LA
PRINCETON
OXFORD RD
BROAD ST
GORDEN
MAIN
WILLIAM
CORA AVE
CURTIS AVE
ACADEMY ST
MAPLE ST
BODINE
GARWOOD AVE
CLINTON
NEW HAMPSHIRE AVE
IRELAND TER
PRINCETON PL
OXFORD
WILSON LA
GREEN ACRE DR
HAMMOND DR
FILBERT ST
ETTORE DR
WARD LA
RADIX
GENOREE LANE
RAILROAD AVE
CHURCH ST
HALL ST
LIBRARY ST
ADMINISTRATION BLDG.
AMES RD
OAK ST
JANVIER ROAD
CHESTNUT ST
CENTRE
LINWOOD
MADISON
WASHINGTON AVE
JEFFERSON AVE
CEDAR
MAPLE
MARIAN ST
VIRGINIA AVE
CARROLL AVE
WALNUT ST
HARTMAN AVE
DAVIS AVE
MONROE
NEW BROOKLYN ROAD
NEWTON AVE
JONES RD
CORKERY
AMES
LANE
ROAD
KING JAMES
EVELYN AVE
MIRACLE DR
AVERY DR
BLACK
HORSE
PIKE
OPERATIONS BLDG.
MELLISA LA
MAIDA WAY
HILLE TER
BRADFORD DR
KILBURN AVE
KILBURN PL
O'BRANES LA
BLUE
BELL
ROAD
CHARM RD
LOCUST LA
FOREST DR
BLACK OAK RD
SILVER BIRCH
KAREN DR
JOANIE DR
WINSLOW
ROAD
GA
160
150
140
130
120
Map #6

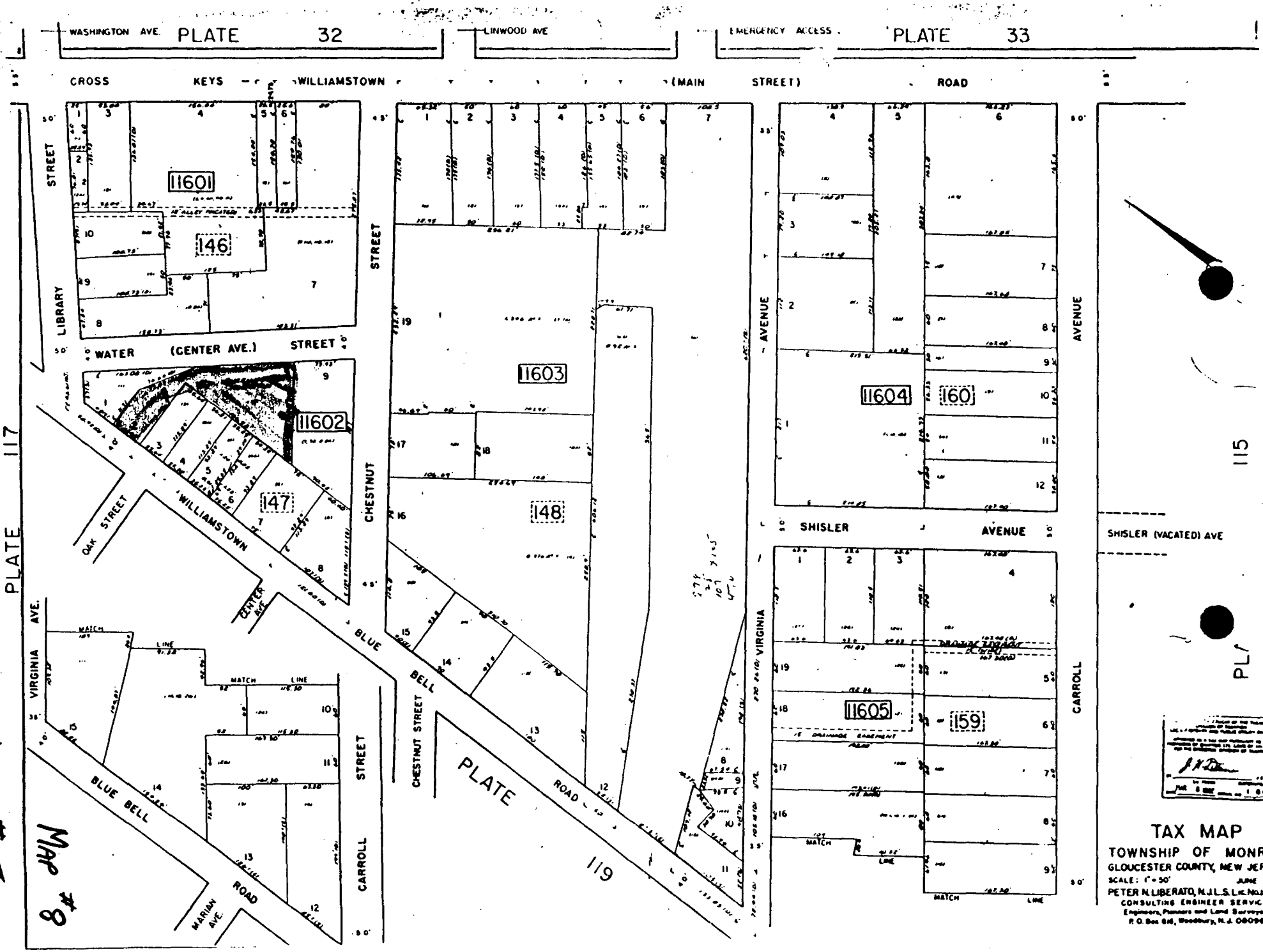


Map # 7
WELL # 4

TAX MAP

TOWNSHIP OF MONROE
GLOUCESTER COUNTY, NEW JERSEY
SCALE: 1" = 100' JUNE 1981

PETER N. LIBERATO, N.J.L.S. Lic. No. 15546
CONSULTING ENGINEER SERVICES
Engineers, Planners and Land Surveyors
P. O. Box 616, Woodbury, N.J. 08096


WASHINGTON AVE.
PLATE 32
LINWOOD AVE
EMERGENCY ACCESS
PLATE 33
CROSS KEYS
WILLIAMSTOWN
(MAIN STREET)
ROAD
LIBRARY STREET
WATER (CENTER AVE.) STREET
11601
146
11602
147
11603
148
11604
160
11605
159
SHISLER AVENUE
SHISLER (VACATED) AVE
VIRGINIA AVE.
CARROLL AVENUE
CHESTNUT STREET
OAK STREET
WILLIAMSTOWN BLUE BELL ROAD
CENTER AVE.
MARIAN AVE.
PLATE 117
PLATE 119
PLATE 115
MATCH LINE
WELL #5
Map #8
TAX MAP
TOWNSHIP OF MONR
GLOUCESTER COUNTY, NEW JE
SCALE: 1" = 50'
PETER N. LIBERATO, N.J.L.S. Lic. No.
CONSULTING ENGINEER SERVIC
Engineers, Planners and Land Surveyo
P.O. Box 648, Woodbury, N.J. 0809

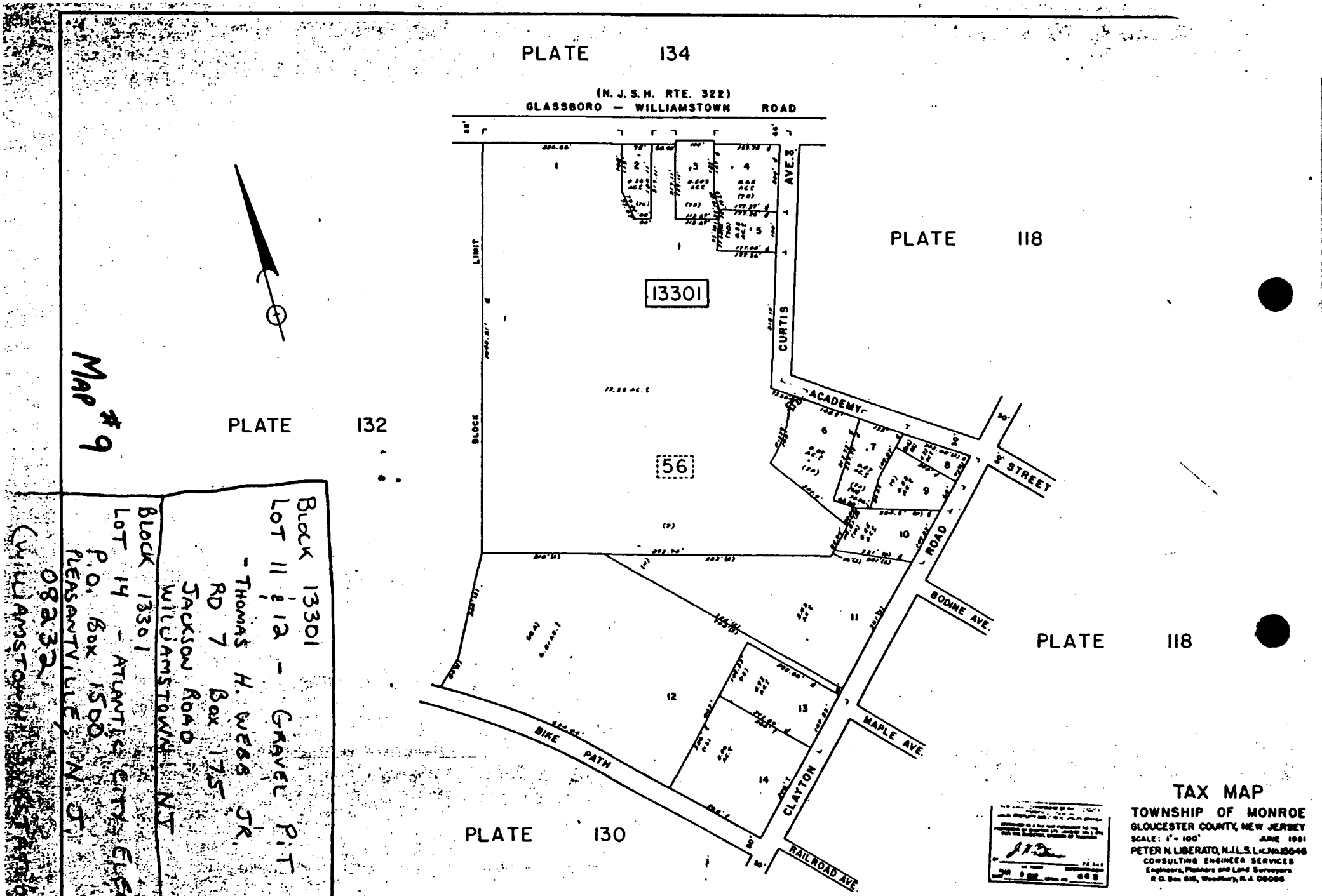


PLATE 134
(N. J. S. H. RTE. 322)
GLASSBORO — WILLIAMSTOWN ROAD
PLATE 118
13301
56
CURTIS AVE.
ACADEMY
S. STREET
L ROAD
BODINE AVE.
MAPLE AVE.
CLAYTON
RAILROAD AVE.
BIKE PATH
BLOCK LIMIT
PLATE 132
PLATE 118
PLATE 130
MAP # 9
BLOCK 13301
LOT 11 & 12 - GRAVEL P.I.T.
- THOMAS H. WEBB JR.
RD 7 Box 175
JACKSON ROAD
WILLIAMSTOWN, N.J.
BLOCK 13301
LOT 14 - ATLANTIC CITY ELEC CO
P.O. Box 1500
PLEASANTVILLE, N.J.
08232
WILLIAMSTOWN, N.J. QUAD
TAX MAP
TOWNSHIP OF MONROE
GLOUCESTER COUNTY, NEW JERSEY
SCALE: 1" = 100' JUNE 1981
PETER N. LIBERATO, N.J.L.S. Lic. No. 15646
CONSULTING ENGINEER SERVICES
Engineers, Planners and Land Surveyors
P.O. Box 616, Woodbury, N.J. 08096

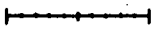
SUBJECT TO REVISION

WATER WITHDRAWAL POINTS AND NJGS CASE INDEX SITES WITHIN 5.0 MILES OF:

LATITUDE 394103
LONGITUDE 745925

DRAFT

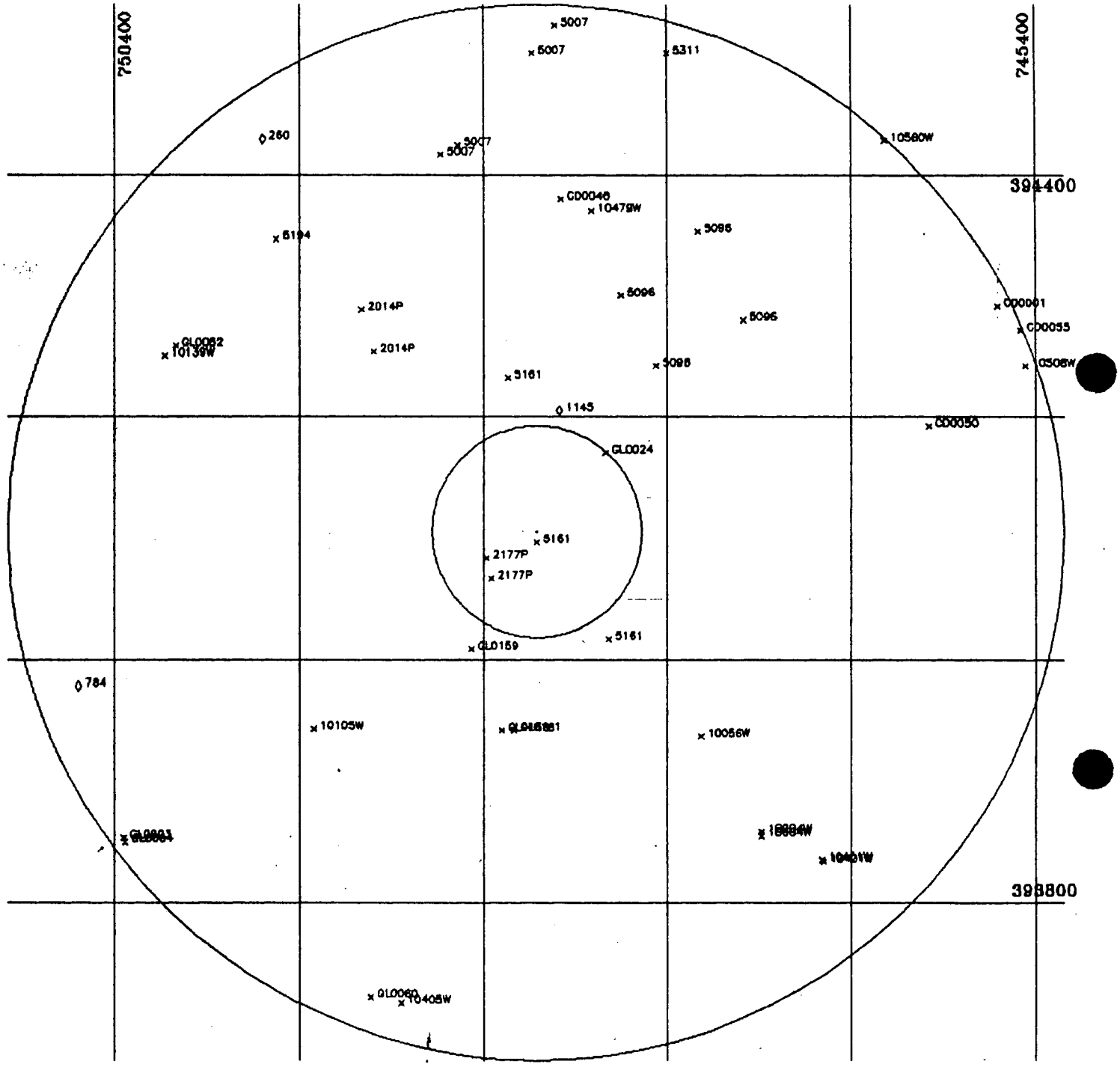
SCALE: 1 Mile



× WATER WITHDRAWAL POINTS
◊ NJGS CASE INDEX SITES
1 MILE AND 5 MILE RADII INDICATED

NJGS CASE INDEX DATA RETRIEVED FROM:
NEW JERSEY GEOLOGICAL SURVEY
ON 12/22/87

PLOT PRODUCED BY:
NJDEP
DIVISION OF WATER RESOURCES
BUREAU OF WATER ALLOCATION
CN-029
TRENTON, NJ 08625
DATE: 04/06/88



Map # 10

SUBJECT TO REVISION

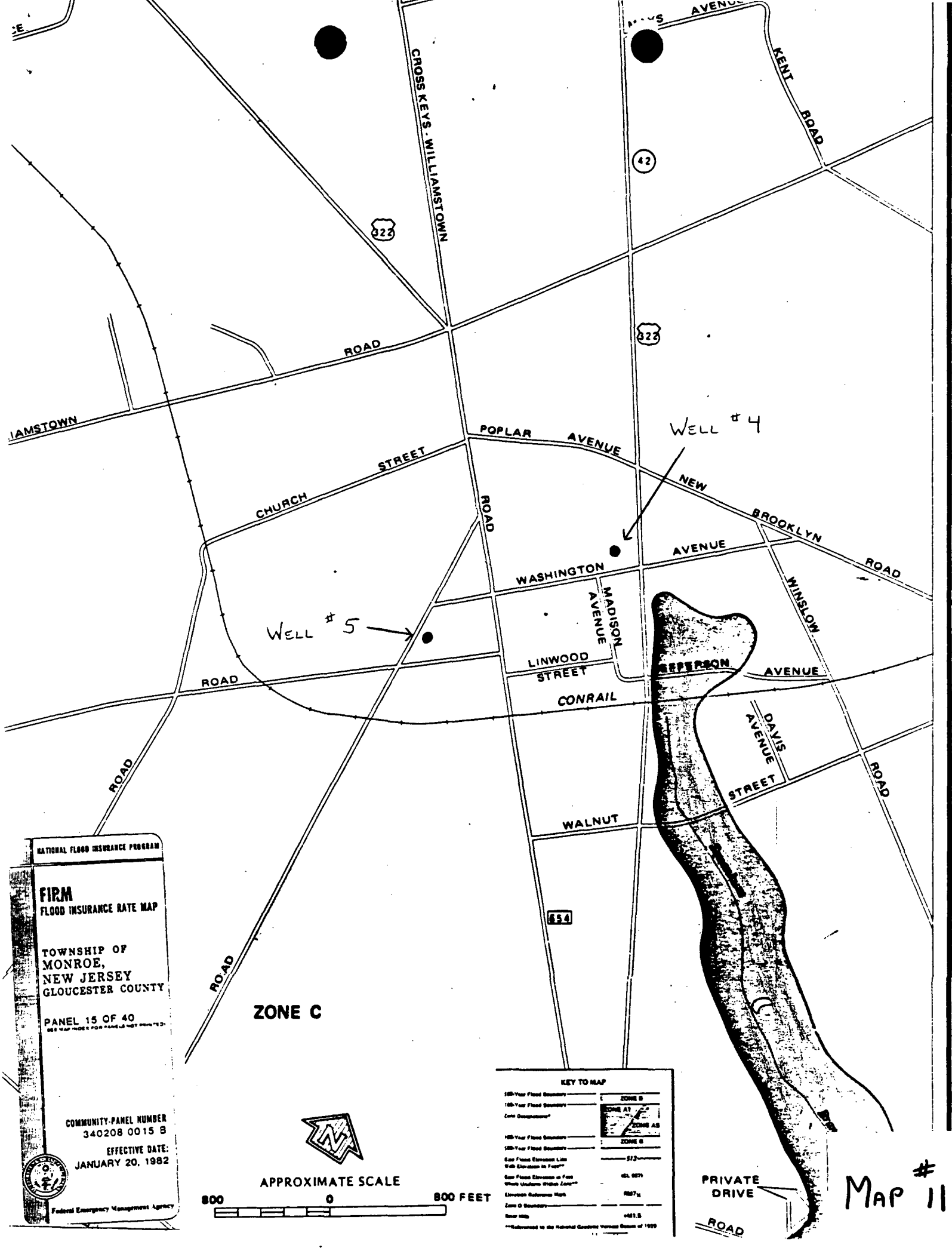
NUMBER	NAME	SOURCEID	LOCID	LAT	LON	LLACC	DISTANCE	COUNTY	MUN	DEPTH	GEO1	GEO2	CAPACITY
GL0003	STEJO INC.	WELL 1		393832	750354	U	4.9	15			GTCH		
GL0004	SMITH, FRED	WELL 1		393830	750353	U	4.9	15			GTCH		
10139W	LENAPE HIGH SCHOOL	3105329	1	394230	750327	F	3.9	05	21	220	GKMW		100
GL0052	SMITH, RALPH J.	WELL 1		394235	750320	U	3.9	15			GTCH		
5194	WASHINGTON TOWNSHIP MUA	3126047	10	394328	750215		3.7	15	18	107	GTCH		1000
10105W	MOON NURSERIES INC.	3108862	1	393926	750151	F	2.8	15	05	115	GTCH		90
10105W	MOON NURSERIES INC.	3111378	2	393926	750151	F	2.8	15	05	122	GTCH		350
2014P	NATIONWIDE MOBILE HOMES	5100033	WELL NO. 1	394253	750120	1	2.7	15	11	81	GTCH		250
GL0060	OLSEN, HAROLD R.	WELL 1		393713	750114	U	4.7	15			GTCH		
2014P	NATIONWIDE MOBILE HOMES	3118471	WELL NO. 2	394232	750112	1	2.3	15	11	135	GTCH		300
10405W	JANVIER VOLUNTEER FIRE CO.	3122246	1	393710	750054	F	4.6	15	05	105	GTCH		150
5007	GARDEN STATE WATER COMPANY	PROPOSED	12	394410	750028		3.7	07	15		GKMW		350
5007	GARDEN STATE WATER COMPANY	3116697	8	394415	750017		3.8	07	15	135	GTCH		500
GL0159	SICKLER, MELVIN E.	WELL 1		394005	750006	U	1.3	15			GTCH		
GL0159	SICKLER, MELVIN E.	POND 1		394005	750008	U	1.3	15			SD		
2177P	VIOLET PACKING CO.	3105150	WELL NO. 2	394050	745958	1	0.5	15	11	143	GTCH		300
2177P	VIOLET PACKING CO.	3115840	3	394040	745955		0.6	15	11	160	GTCH		60
GL0156	LOIBL, FRANK J.	STREAM 1		393925	745948	U	1.9	15			SD		
5161	MONROE MUA	3105375	6	394219	745944	1	1.5	15	11	144	GTCH		400
GL0181	LESHAY FARMS, SAMUEL	WELL 1		393925	745940	U	1.9	15			GTCH		
5007	GARDEN STATE WATER COMPANY	3122273	10	394500	745928	F	4.5	07	15	430	GKMW		350
5161	MONROE MUA	3108035	8	394050	745925	1	0.0	15	11	160	GTCH		500
5007	GARDEN STATE WATER COMPANY	PROPOSED	11	394514	745913		4.8	07	15		GTCH		350
CD0046	MATRO FARMS, GAETANO	WELL 1		394348	745909	U	3.2	07			GTCH		
CD0046	MATRO FARMS, GAETANO	POND 1		394348	745909	U	3.2	07			SCMUL		
10479W	WINSLOW TOWNSHIP	3123879	1	394342	745849	F	3.1	07	36	105	GTCH		100
GL0024	FATHER & SON NURSERY	WELL 1		394142	745840	U	1.8	15			GTCH		
5161	MONROE MUA	3114080	7	394010	745838	1	1.2	15	11	147	GTCH		800
5096	WINSLOW TWP.WATER & SEWER DEPT	3105578	3	394300	745830		2.4	07	36	97	GTCH		60
5096	WINSLOW TWP.WATER & SEWER DEPT	3106874	4	394225	745807		1.9	07	36	107	GTCH		1000
5311	SOUTHERN JERSEY WATER CO.	PROPOSED WELL1		3945	7458		4.7	07	36	140	GTCH		700
5096	WINSLOW TWP.WATER & SEWER DEPT	3105543	2	394332	745740		3.2	07	36	103	GTCH		600
10056W	MONROE TWP., COMMUNITY AFFAIRS	3114496	1	393922	745738	F	2.5	15	11	111	GTCK		
5096	WINSLOW TWP.WATER & SEWER DEPT	3105542	1	394248	745710		2.8	07	36	113	GTCH		1200
10004W	CECIL FIRE CO. #1(TWP. MONROE)	3119549	1	393833	745658	F	3.6	15	11	128	GTCK		300
10004W	CECIL FIRE CO. #1(TWP. MONROE)	3119550	2	393835	745658	F	3.6	15	11	118	GTCK		13
10401W	FRIENDLY VLG. OF WILLIAMSTOWN	3105733	2	393821	745619	F	4.1	15	11	167	GTCH		200
10401W	FRIENDLY VLG. OF WILLIAMSTOWN	3105732	1	393820	745618	F	4.1	15	11	167	GTCH		200
10560W	CERTAIN-TEED CORP.	5100034	1	394417	745538	F	5.0	07	36	180	GTCH		300
CD0050	CURCIO, MICHAEL A.	WELL 1		394155	745509	U	3.9	07			GTCH		
CD0081	DE SILVO, DAN	3105210	WELL 1	394255	745425	T	4.9	07	36	90	GTCH		250
CD0055	FIORENTINO, MARK W.	WELL 1		394243	745410	U	5.0	07			GTCH		
10508W	BROWN, ALBERT K. JR.	3105078	1	394225	745407	F	4.9	07	36	100	GTCK		

Number of Observations: 43

Page 1 of NJGS CASE INDEX SITES WITHIN 5.0 MILES OF 394103 LAT. 745925 LON. AS OF 12/22/87 (IN ORDER BY DECREASING LONGITUDE) - 04/06/88

SITENUM	NAME	LAT	LON	DISTANCE	CONTAM	FMCODE1	FMCODE2	STATUS1	STATUS2
784	EASTCOAST POLLUTION CONTROL, INC, CLAYTON, GLOUCESTER CO.	393947	750423	4.6	0	0160	1020	1	
260	TURNERSVILLE GETTY, BLACK HORSE PIKE, GLOUCESTER CO.	394418	750224	4.6	51	1020	1025	1	C
1145	EGLI RESIDENCE, 731 SICKLERVILLE RD, MONROE TWP, GLOUSETER CO.	394203	745910	1.2				3	

Number of Observations: 3


CROSS KEYS-WILLIAMSTOWN
KENT ROAD
42
323
323
ROAD
POPLAR AVENUE
WELL # 4
NEW BROOKLYN ROAD
CHURCH STREET
ROAD
WASHINGTON AVENUE
MADISON AVENUE
WELL # 5
WINSLOW
LINWOOD STREET
JEFFERSON AVENUE
ROAD
CONRAIL
DAVIS AVENUE
STREET
ROAD
WALNUT
ROAD
654
ZONE C
PRIVATE DRIVE
ROAD
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
TOWNSHIP OF MONROE, NEW JERSEY GLOUCESTER COUNTY
PANEL 15 OF 40
COMMUNITY-PANEL NUMBER 340208 0015 B
EFFECTIVE DATE: JANUARY 20, 1982
Federal Emergency Management Agency
APPROXIMATE SCALE
800 0 800 FEET
KEY TO MAP
ZONE B
ZONE A1
ZONE A5
ZONE B
MAP # 11

Monroe Municipal Utilities Authority

372 South Main Street
Williamstown, New Jersey 08094

Jacqueline Schoenewald
Executive Director
Phone: 629-1444

George Cossabone
Superintendent
Phone: 629-7586

APR 15 1988

April 5, 1988

Bureau of Planning and Assessment
65 Prospect Street
Trenton, New Jersey 08618

Attn: Mr. Frank Faranca

Dear Frank,

Enclosed is the copies of our most recent testing results for mercury, sodium, fluorides, and inorganics which you requested.

If you have any questions regarding the above please call me at (609) 629-7586.

Very truly yours,

MONROE MUNICIPAL UTILITIES AUTHORITY

George P. Cossabone
Superintendent

GPC/amb
cc: File

ENCS.

ATTACHMENT A

P & P LABORATORIES, INC.
ENVIRONMENTAL & CLINICAL TOXICOLOGY
2025 Woodlynne Avenue
Woodlynne, NJ 08107
(609) 962-6611
DEP # 04479

WATER POTABILITY ANALYSIS

CLIENT :
Monroe Twp. MUA
372 S. Main Street
Williamstown, NJ 08094

WASHINGTON AVE
WELL #4

SAMPLE NO.	:8424	COLLECTED BY	:P & P Lab.
DATE COLLECTED	:1/29/88	TIME	:11:25
DATE RECEIVED	[redacted]	TIME	:16:00
SOURCE OF SAMPLE	[redacted]		
Location	:		

METALS & INORG/ORGANICS	RESULTS *	MCL **	COMMENTS
Arsenic		0.05	
Barium		0.10	
Cadmium		0.01	
Chromium		0.05	
Copper		0.05	
Fluoride		0.8-4.0	
Lead		0.05	
Mercury	[redacted]	0.002	
Sodium	< 0.002	50.00	
Selenium		0.01	
Silver		0.05	
Zinc		1.00	
Nickel			
Chlordane			

* mg/l unless specified
** Maximum Contaminant Level
< = Less Than
TNTC= Too Numerous To Count

Henry J. Pielichowski
Tech. Lab. Supervisor

P & P LABORATORIES, INC.
ENVIRONMENTAL & CLINICAL TOXICOLOGY
2025 Woodlynne Avenue
Woodlynne, NJ 08107
(609) 962-6611
DEP # 04479

WATER POTABILITY ANALYSIS

CLIENT :
Monroe Twp. MUA
372 S. Main Street
Williamstown, NJ 08094

Avery Dr
Test Well

SAMPLE NO.	:8425	COLLECTED BY	:P & P Lab
DATE COLLECTED	:1/29/88	TIME	:11:43
DATE RECEIVED	[redacted]	TIME	16:00
SOURCE OF SAMPLE	[redacted]		
Location	:		

METALS & INORG/ORGANICS	RESULTS *	MCL **	COMMENTS
Arsenic		0.05	
Barium		0.10	
Cadmium		0.01	
Chromium		0.05	
Copper		0.05	
Fluoride		0.8-4.0	
Lead		0.05	
[redacted]		0.002	
Sodium	<0.002	50.00	
Selenium		0.01	
Silver		0.05	
Zinc		1.00	
Nickel			
Chlordane			

* mg/l unless specified
** Maximum Contaminant Level
< = Less Than
TNTC= Too Numerous To Count

Henry J. Pielichowski
Tech. Lab Supervisor

P & P LABORATORIES, INC.
ENVIRONMENTAL & CLINICAL TOXICOLOGY
2025 Woodlynne Avenue
Woodlynne, NJ 08107
(609) 962-6611
DEP # 04479

WATER POTABILITY ANALYSIS

CLIENT :
Monroe Twp. MUA
372 S. Main Street
Williamstown, NJ 08094

Water St well #5

SAMPLE NO. :8422 | COLLECTED BY :P & P Lab
DATE COLLECTED :1/29/88 | TIME :9:35
DATE RECEIVED [redacted] | TIME :16:00
SOURCE OF SAMPLE [redacted]
Location :

METALS & INORG/ORGANICS	RESULTS *	MCL **	COMMENTS
Arsenic		0.05	
Barium		0.10	
Cadmium		0.01	
Chromium		0.05	
Copper		0.05	
Fluoride		0.8-4.0	
Lead		0.05	
[redacted]	[redacted]	0.002	
Sodium	<0.002	50.00	
Selenium		0.01	
Silver		0.05	
Zinc		1.00	
Nickel			
Chlordane			

* mg/l unless specified
** Maximum Contaminant Level
< = Less Than
TNTC= Too Numerous To Count

Henry J. Pielichowski
Tech. Lab. Supervisor

HJP

P & P LABORATORIES, INC.
ENVIRONMENTAL & CLINICAL TOXICOLOGY
2025 Woodlynne Avenue
Woodlynne, NJ 08107
(609) 962-6611
DEP # 04479

WATER POTABILITY ANALYSIS

CLIENT :
Monroe Twp. MUA
372 S. Main Street
Williamstown, NJ 08094

LAKE AVE
Well #6

SAMPLE NO.	:8433	COLLECTED BY	:P & P Lab
DATE COLLECTED	[redacted]	TIME	:12:07
DATE RECEIVED	:1/29/88	TIME	:16:00
SOURCE OF SAMPLE	[redacted]		
Location	:		

METALS & INORG/ORGANICS	RESULTS *	MCL **	COMMENTS
Arsenic		0.05	
Barium		0.10	
Cadmium		0.01	
Chromium		0.05	
Copper		0.05	
Fluoride		0.8-2.0	
Lead		0.05	
[redacted]		0.002	
Sodium	<0.002	50.00	
Selenium		0.01	
Silver		0.05	
Zinc		1.00	
Nickel			
Chlordane			

* mg/l unless specified
** Maximum Contaminant Level
< = Less Than
TNTC= Too Numerous To Count

Henry J. Pielichowski
Tech. Lab. Supervisor

P & P LABORATORIES, INC.
ENVIRONMENTAL & CLINICAL TOXICOLOGY
2025 Woodlynne Avenue
Woodlynne, NJ 08107
(609) 962-6611
DEP # 04479

WATER POTABILITY ANALYSIS

CLIENT :
Monroe Twp. MUA
372 S. Main Street
Williamstown, NJ 08094

CORKERY LANE
Well #7

SAMPLE NO.	:8421	COLLECTED BY	:P & P Lab.
DATE COLLECTED	[redacted]	TIME	:11:52
DATE RECEIVED	:1/28/88	TIME	:16:00
SOURCE OF SAMPLE	[redacted]		
Location	:		

METALS & INORG/ORGANICS	RESULTS *	MCL **	COMMENTS
Arsenic		0.05	
Barium		0.10	
Cadmium		0.01	
Chromium		0.05	
Copper		0.05	
Fluoride		0.8-4.0	
Lead		0.05	
[redacted]		0.002	
Sodium	<0.002	50.00	
Selenium		0.01	
Silver		0.05	
Zinc		1.00	
Nickel			
Chlordane			

* mg/l unless specified
** Maximum Contaminant Level
< = Less Than
TNTC= Too Numerous To Count

Henry J. Pielichowski
Tech. Lab. Supervisor

P & P LABORATORIES, INC.
ENVIRONMENTAL & CLINICAL TOXICOLOGY
211 White Horse Pike
Audubon, NJ 08106
(609) 547-8421
DEP # 04479

CERTIFICATE OF ANALYSIS

IDENTIFICATION		SAMPLE SOURCE	
name....	Monroe Twp M.U.A.	source.....	McDonald's
address.	372 South Main Street Williamstown,NJ 08094		Men's Room Sink
		collection.....	[redacted] 3:00
ID #....	7932	received.....	12/28/87 13:45
		completion.....	12/29/87
		collected by....	P & P Lab

RESULTS (mg/l unless specified)

TEST PARAMETER	RESULTS	TEST PARAMETER	RESULTS
BOD(5).....		Tot. Alkalinity...	
COD.....		Chlorine Demand...	
TOC.....		Chlorine Residual.	
Suspended Solids..		Chlorides.....	
Total Solids.....		Petro-hydrocarbons	
T. Diss. Solids...		Hardness as CaCO3.	
Sett. Solids(ml/l)		Aluminum.....	
pH.(Units).....		Antimony.....	
Phenols.(ug/l)....		Barium.....	
Cyanide(Total)....		Cadmium.....	
Cyanide(Free).....		Calcium.....	
Fluoride.....		Chromium (Tot)...	
ABS/LAS(mg/l LAS)...		Chromium (Hex)...	
Oil & Grease.....		Copper.....	
TK Nitrogen as N..		Iron.....	
Ammonia as N.....		Lead.....	
Org. Nitrogen as N		Magnesium.....	
Nitrate - N.....		Manganese.....	
Nitrite - N.....		Mercury.....	
T. Phosphate (P)..		Nickel.....	
O. Phosphate (P)..		Potassium.....	
Sulfate.....		Selenium.....	
Sulfite.....		[redacted]	
Color.....		Zinc.....	
Turbidyty(NTU)...		Fecal Coliform *..	
Conduct.(umohms)..		Total Coliform *..	
Temperature C-deg.			
Langelier Index			

* col/100 ml

Henry J. Pielichowski
Tech. Lab. Supervisor

Quality Control Laboratory and Environmental Support Alliance
243 White Horse Pike "Certified Test Laboratory"
Audubon, New Jersey 08106 DEP #04002 609-428-1303 609-296-7[illegible]

Lab. Information
Analysis # E 8190
Date rec'd at lab 12/5/85 T 2:45pm
By
Date rec'd by Tech. T
By
Date analyses started T
Date analyses comp. T

Customer Information

Co. Monroe MUA

Address Williamstown, N.J. Phone

Sample drawn by A.. Date 12/5/85 Time 1:15pm

From Corkery's Lane - Well #7

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides	less than 0.05mg/l			
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury				
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Coliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

Remarks

Bruce Greenwald, Lab Mgr.

Quality Control Laboratory and Environmental Support Alliance

243 White Horse Pike "Certified Tes" Laboratory"
Audubon, New Jersey 08106 DE [redacted] 04002 609-428-1303 609-296-[redacted]

Lab. Information
Analysis # E 8190
Date rec'd at lab 12/5/85 T 2:45pm
By
Date rec'd by Tech. T
By
Date analyses started T
Date analyses comp. T

Customer Information

Co. Monroe MUA

Address Williamstown, N.J. Phone

Sample drawn by A.. Date 12/5/85 Time 1:15pm

From Corkery's Lane - Well #7

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides	less than 0.05mg/l			
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury				
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Coliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

Remarks

Bruce Greenwald, Lab Mgr.

Quality Control Laboratory and Environmental Support Alliance

243 White Horse Pike "Certified Test[illegible] Laboratory"
Audubon, New Jersey 08106 DE[illegible] #04002 609-428-1303 609-296-7[illegible]

Customer Information

Co. Monroe MUA

Address Williamstown, N.J. Phone

Sample drawn by A.L. Date 12/5/85 Time 1:23pm

From Well #6 Lake Ave.

Lab. Information

Analysis # R 8531

Date rec'd at lab 12/5/85 T 2:45pm

By

Date rec'd by Tech. T

By

Date analyses started T

Date analyses comp. T

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides	less than 0.05mg/l			
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury				
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Coliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

Remarks

Bruce Greenwald, Lab Mgr.

Quality Control Laboratory and Environmental Support Alliance
243 White Horse Pike "Certified Tes Laboratory"
Audubon, New Jersey 08106 DE [redacted] i 04002 609-428-1303 609-296-7[redacted]

Lab. Information
Analysis # E 8531
Date rec'd at lab 12/5/85 T 2:45pm
By
Date rec'd by Tech. T
By
Date analyses started T
Date analyses comp. T

Customer Information
Co. Monroe MUA
Address Williamstown, N.J. Phone
Sample drawn By A.L. Date 12/5/85 Time 1:23pm
From Well #6 Lake Ave.

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides	less than 0.05mg/l			
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury				
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Coliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

Remarks

Bruce Greenwald, Lab Mgr.

Quality Control Laboratory and Environmental Support Alliance

243 White Horse Pike "Certified Te Laboratory"
Audubon, New Jersey 08106 DE [redacted])# 04002 609-428-1303 609-296-[redacted]

Lab. Information
Analysis # E 8533
Date rec'd at lab 12/5/85 T 2:45pm
By
Date rec'd by Tech. T
By
Date analyses started T
Date analyses comp. T

Customer Information

Co. Monroe MUA

Address Williamstown, N.J. Phone

Sample drawn by A.L. Date 12/5/85 Time 1:10pm

From Well #5, Water Street, (restroom tap)

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides	less than 0.05mg/l			
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury				
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Coliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

Remarks

Bruce Greenwald, Lab Mgr.

Quality Control Laboratory and Environmental Support Alliance
243 White Horse Pike
Audubon, New Jersey 08106
"Certified Tes[illegible] Laboratory"
DE[illegible] 04002
609-428-1303 609-296-7[illegible]

Lab. Information
Analysis # E 8533
Date rec'd at lab 12/5/85 T 2:45pm
By
Date rec'd by Tech. T
By
Date analyses started T
Date analyses comp. T

Customer Information

Co. Monroe MUA

Address Williamstown, N.J. Phone

Sample drawn by A.L. Date 12/5/85 Time 1:10pm

From Well #5, Water Street, (restroom tap)

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides	less than 0.05mg/l			
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury				
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Coliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

Remarks

Bruce Greenwald, Lab Mgr.

P & P LABORATORIES, INC.
ENVIRONMENTAL & CLINICAL TOXYCOLOGY
211 White Horse Pike
Audubon, NJ 08106
(609) 547-8421
DEP # 04479

IDENTIFICATION		SAMPLE SOURCE	
name	: Monroe Twp M.U.A.	source	: McDonalds
address	: 372 South Main St. Williamstown, NJ 08094		Men's Room Sink
ID #	5544	received	: 8/05/87 17:00

P R I M A R Y D R I N K I N G W A T E R T E S T S

[redacted]

PARAMETERS	RESULTS *	MCL **	COMMENTS
Arsenic	<0.05	0.05	
Barium	<0.10	0.10	
Cadmium	<0.01	0.01	
Chromium	<0.05	0.05	
Lead	<0.05	0.05	
Mercury	<0.002	0.00	
Nitrate - N	4.45	10.00	
Selenium	<0.01	0.01	
Silver	<0.05	0.05	
Fluoride	<0.01		
Sodium	25.64	50.00	

S E C O N D A R Y D R I N K I N G W A T E R T E S T S

PARAMETERS	RESULTS *	MCL **	COMMENTS
Hardness		250.00	
Sodium		50.00	
Odor		4 TON	
Manganese		0.05	
Foaming Agents		0.50	
Copper		1.00	
Chlorides		250.00	
Sulfate		250.00	
Zinc		1.00	
pH		5.5 - 8.5	
TDS		250.00	
Corrosivity ***		0	

* mg/l unless specified
** maximum contamination level
*** Langelier index

Henry J. Pielichowski
Tech. Lab. Supervisor

Henry Pielichowski

Quality Control Laboratory and Environmental Support Alliance

243 White Horse Pike • "Certified [illegible] Laboratory"
Audubon, New Jersey 08106 DE[illegible]. ID# 04002 609-428-1303 609-296-[illegible]

Lab. Information
Analysis # C 8896
Date rec'd at lab 10/1/84 T 2 P.M.
By
Date rec'd by Tech. T
By
Date analyses started T
Date analyses comp. T

Customer Information

Co. Monroe M.U.A.

Address Williamstown,N.J. Phone

Sample drawn by B.G. Date 10/1/84 Time 12:42 P.M.

From McDonald's - Black Horse Pike (restroom tap)

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides	14mg/l			
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color	1.2 color units			
Copper	less than .05mg/l			
Density				
D. Oxygen				
Detergents ABS/LAS	less than .05mg/l			
Fluorides				
Fungicides				
Hardness	44mg/l			
Hydrogen Sul.				
Herbicides				
Iron	0.06mg/l			
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese	less than .05mg/l			
Mercury				
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor	1 T.O.N.			
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate	3mg/l			
Sulfite				
Sulfide				
Sodium	7mg/l			
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc	less than .05mg/l			
Zirconium				

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Coliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

Remarks

Bruce Greenwald, Lab Mgr.

DELIVERY INFORMATION

PLANT DELIVERED WATER (mgd,month,year) Max [illegible] MGD	Min [illegible] MGD — Annual Average [illegible] MGD
BULK PURCHASES (provider,mgd)	NONE
BULK SALES (customer, mgd)	NONE
NUMBER OF SERVICES [illegible]	% METERED [illegible]
MUNICIPALITIES SERVED (est. services in each)	ALL SERVICES IN MONROE TWP
	TOTAL ESTIMATED POPULATION SERVICED 13000
CURRENT/RECENT WATER RESTRICTIONS	NONE
NEW CONSTRUCTION (Project Numbers)	NONE

DISTRIBUTION MAINS: Sizing 4" (min) to 16" (max)
Pressures 45 (min) to 65 (max)
Hydrants/Flushing Program YES / YES

MONITORING & REPORTING

PARAMETER(S)	*FREQUENCY REQUIRED*	*FREQUENCY PERFORMED*
Coliform	[illegible]	[illegible]
Inorganics & NA	EVERY 3 YRS	10/1/94
Nitrate	EVERY 3 YRS	5/30/94
Trihalomethanes	[illegible]	[illegible]
Organics	N/A	N/A
Turbidity	N/A	N/A
RADIONUCLIDES	EVERY 9 YRS	6/94
[illegible]	[illegible]	10/94
LEAD	JAN - JUNE	1/95 - 5/95
[illegible]	[illegible]	11/94

NAME OF LABORATORY QUALITY CONTROL CERTIFICATION # CAGE

ADDRESS AUDUBON N.J.

COMPLIANCE EVALUATION

SOURCE DEFICIENCIES NONE NOTED

TREATMENT DEFICIENCIES NONE NOTED

COMPLIANCE EVALUATION (Continued)

STORAGE AND/OR DISTRIBUTION DEFICIENCIES THERE ARE UNDERSIZED MAINS WITHIN THE SYSTEM

LICENSING, MONITORING AND/OR REPORTING DEFICIENCIES NONE NOTED

COMPLIANCE SAMPLING VIOLATIONS:

LOCATION	DATA SOURCE	PARAM	MAX CONTMNT LEVEL	RESULT	LOCATION	DATA SOURCE	PARAM	MAX CONTMNT LEVEL	RESULT

OVERALL COMPLIANCE RATING:

☒ ACCEPTABLE ☐ CONDITIONALLY ACCEPTABLE ☐ UNACCEPTABLE

NOTICE: YOU ARE REQUIRED TO INFORM THE N.J.D.E.P. IN WRITING OF YOUR ACTUAL OR INTENDED ACTIONS TO COMPLY WITH N.J.S.A. 58:12A-1 ET SEQ. VIA IMPLEMENTATION OF REMEDIAL MEASURES TO CORRECT THE DEFICIENCIES LISTED IN THIS REPORT. FAILURE TO ADEQUATELY RESPOND IN A TIMELY FASHION WILL RENDER YOU LIABLE FOR PENALTIES OF UP TO $5,000.00 FOR EACH VIOLATION, PURSUANT TO N.J.A.C. 7:10-3.

INSPECTOR: [signature] *Signature*

[illegible] *Name*

[illegible] *Title*

[illegible] *Organization*

PERSON INTERVIEWED: GEORGE COSGROVE *Name*

LICENSED OPERATOR *Title*

MONROE TWP MUA *Organization*

[illegible] *Region*

Quality Control Laboratory an ironmental Support Alliance

243 White Horse Pike
Audubon, New Jersey 08106
"Certified [redacted], Laboratory"
D[redacted] ID# 04002
609-428-1303 609-296[redacted]

Information
Analysis # F 430 N.R.

Date rec'd at lab 1/23/86 2:30pm

By

Date rec'd by Tech. T

By

Date analyses started T

Date analyses comp. T

Customer Information

Co. Monroe Township MUA 0811002

Address Williamstown, N.J. Phone

Sample drawn by A.L. Date 1/23/86 Time 11:50am

From Well #4 - Washington Ave.

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides				
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury	.0017mg/l			
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Coliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

RECEIVED
JAN 1986
N.J. State Dept. of Environmental Protection
BUREAU OF POTABLE WATER

Remarks

B-48

Bruce Greenwald, Lab Mgr

Quality Control Laboratory an[illegible]nmental Support Alliance

243 White Horse Pike
Audubon, New Jersey 08106

"Certified [illegible] Lab[illegible]ory"
D[illegible]. ID# 04002

609-428-1303 609-296[illegible]

Lab Information
An s # F 2195

Date rec'd at lab 2/27/86 T 4:20pm

By _____

Date rec'd by Tech. _____ T _____

By _____

Date analyses started _____ T _____

Date analyses comp. _____ T _____

Customer Information

Co. Monroe Township MUA

Address Williamstown,N.J. Phone _____

Sample drawn by A.L. Date 2/27/86 Time 11:45am

From Well #4, Washington Ave.

CHEMICAL

Test	Quan.	Meth.	Tech.	Date/Time
Acidity				
Alkalinity				
Aluminum				
Ammonia				
Antimony				
Arsenic				
Acid Extr.				
Barium				
BOD (5 day)				
Bromides				
Bismuth				
Base-Neutral Extr.				
Cyanide				
Chlorine				
Chlorides				
Cadmium				
Calcium				
Carbon Dioxide				
Cesium				
COD				
Chromium				
Cobalt				
Color				
Copper				
Density				
D. Oxygen				
Detergents ABS/LAS				
Fluorides				
Fungicides				
Hardness				
Hydrogen Sul.				
Herbicides				
Iron				
Iodine				
Iodide				
Kjeldahl N				
Lanthan				

Test	Quan.	Meth.	Tech.	Date/Time
Lead				
Lithium				
Magnesium				
Manganese				
Mercury	.0016mg/1			
Molybdenum				
Moisture				
Nickel				
Nitrate				
Nitrite				
Odor				
Oils & Grease				
Pesticides & PCB's				
Petro Hydrocarbons				
Phenols				
Phosphate				
Phosphorus				
Potassium				
Platinum				
Selenium				
Silver				
Sulfate				
Sulfite				
Sulfide				
Sodium				
Silica				
S. Matter				
THM				
Thallium				
Turbidity				
Taste				
T. Solids				
TDS				
TOC				
Vanadium				
Volatile Org.				
Volatile Solids				
Zinc				
Zirconium				

BACTERIOLOGICAL

Test	Dil.	Total	Meth.	Tech.	Date/Time
T. Cells					
T. Coliform					

Test	Dil.	Total	Meth.	Tech.	Date/Time
F. Coliform					
F. Strep					

RECEIVED
1986

Remarks _____

N.J. State Dept. of Environmental Protection
BUREAU OF POTABLE WATER

B-49

Bruce Greenwald, Lab Mgr.

GLOUCESTER COUNTY DEPARTMENT OF HEA

Page ____ of ____

COMPLAINT INVESTIGATION

~~Hold for sample~~ GA

GCHD FILE #: 86361

MUNICIPALITY: Monroe

DWM FILE #: file

DATE & TIME RECEIVED referred down by Regnlg

INVESTIGATOR: S. Weber

DATE & TIME ASSIGNED 7-18-86

LOCATION: Env. Services Bldg

PROPERTY OWNER: Monroe Twp Bd of Ed.

ADDRESS: Clayton Ave Winstown

MAILING ADDDRESS: ____

BLOCK ____ LOT: ____

RESPONSIBLE PARTY: ____

LOCATION TELEPHONE #: ____

ADDRESS: ____

FACILITY ID #: ____

NJ DEP REP. ____

TELEPHONE #: ____

COMPLAINANT: Mercury contamination in well contact V. Comiola TELEPHONE #: ____

NATURE OF COMPLAINT: reported by Dutchtown Lab & Qual. Control Lab

PHOTOGRAPHS TAKEN: ____ SAMPLES: ____

FINDINGS:

7/11/86 Investigation on site revealed well to be inside 10' deep pit in Environmental Services Bldg well is 2" drive on driven well w/ a jet pump & galvanized water tank. Various paints & cleaning agents for school stored in building. Building is near athletic fields. Office personnel indicate a guy in Elmer maintains fields. Found a 35 gal container of product called "Ster-Bac 151 Weed Killer & Sterilant approx 10' from well pit - which has been opened (has spout on end) - manufactured by Sunshine Chem P.O. Box 767 Cherry Hill NJ 800-232-6576 contains Monuron trichloroacetate. Like product was Weed Killer - Green Death - Same manuf. - Water sample collected for heavy metals + mercury from outside faucet. Note - office people indicate that spray tanks not hooked up to faucet to fill. - Site was former orchard per office personnel. - S. Weber

8-28-86 Spoke w/ Mr. Shapiro of Sunshine Chem. - Neither product of theirs contains mercury. SW

DISPOSITION: NFA

Dec 10-17-86

Supervisor Signature & Date

Investigator Signature

C3013

ATTACHMENT B 5C

COUNTY OF GLOUCESTER
STATE OF NEW JERSEY
DEPARTMENT OF HEALTH
CARPENTER ST. & ALLENS LANE
WOODBURY, NEW JERSEY 08096-2699
(609) 853-3405

ROY L. BAYLOR
FREEHOLDER

ROBERT J. SMITH, M.P.H., DIRECTOR
DEPARTMENT OF HEALTH

Monroe Township Board of Health
Environmental Services Building
Academy Street
Williamstown, NJ 08094

September 3, 1986

SUBJECT: Complaint #86364
Individual Water Supply System
Environmental Services Buildin
Monroe Township

Enclosed is a copy of the water analysis results for the sample collected from the subject water supply on July 17, 1986. The sample was analyzed for heavy metals. The results confirm the previously found mercury concentration. The source of the mercury concentration is unknown. During our investigation the cleaning products stored in the building were noted and none indicated that they contained mercury. Additonally the company which distributes the weed killer (Sunshine Chemical) present was contacted and they confirmed that no mercury was contained in those products either.

In interviews with office personnel it was indicated that the area was an orchard in the past. It is possible the mercury originated in sprays used at that time which have now reached the water table.

Due to the excessive mercury concentration present the water should not be used for drinking or cooking. It is recommended that bottled water be provided until a permanent alternate supply can be supplied.

If you have any questions, please do not hesitate to contact this office.

Very sincerely yours,

Steven Weber

STEVEN WEBER
Chief Sanitary Inspector

SW/aal
Enclosure

1686 300 1986

Three Hundred Years of Public Service

I. Methodology

This analysis adhered to the methods described in:

. EPA Manual of Methods for the Analysis of Water and Wastes, 1979.

II. Analytical Results

A. Metals and Bacteria

Parameter	Sample Designation NAC1487 SW860717-A
Arsenic, total, mg/l	<0.01
Barium, total, mg/l	<0.10
Cadmium, total, mg/l	<0.01
Chromium, total, mg/l	<0.05
Lead, total, mg/l	<0.05
Mercury, total, mg/l	0.0036
Selenium, total, mg/l	<0.01
Silver, total, mg/l	<0.01
Sodium, total, mg/l	7.5
Copper, total, mg/l	0.23
Iron, total, mg/l	0.19
Manganese, total, mg/l	0.042
Zinc, total, mg/l	<0.05

max allowable concentration is 0.002 mg/l

GLOUC[illegible]R COUNTY DEPARTMENT OF HEALTH [illegible]ORATORY
18 E. High Street
Glassboro, New Jersey 08028
881-8229

Water Analysis Field Data Sheet

Municipality: Monroe	Reason for sample (e.g. new well)
Owner: Bd of Education	Phone number
Location: Env. Services Bldg	Mailing Address: Academy St Wmstown
Sample #: W860717A / Time of Collection: 2:00pm	Date sampled: 7/17/86 / Name of sampler: S. Weber
Diagram of sample Sites (non-potable)	Sample taken from: Outside faucet / Water Temp.
	Depth of Well: 7 7'shallow / Well to Septic (type)
	Analysis requested: 10 & 20 Mercury + Metals
Field Comments, sampling conditions: run water 10 min	Received at lab Date: W-Bed 7-21-86 Time: 11:15 / Lab # / Analysis conducted Date: / Time:

LABORATORY RESULTS

BACTERIOLOGICAL	CHEMICAL
A. MEMBRANE FILTER (colonies/100 ml.)	1. Nitrate (NO_3-N mg/l)
Total Coliforms:	2. pH
Fecal Coliforms:	3. Iron (mg/l)
Fecal Streptococci:	4. Manganese (mg/l)
B. MPN (most probable number/100 ml)	5. M.B.A.S. (mg/1 LAS)
Total Coliforms:	
Fecal Coliforms:	
Fecal Streptococci:	
C. Total Plate Count (colonies/ml)	Laboratory Director

GC1214

3/33.149 D

Form 81-5M-8-51

DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
Division of Water Policy & Supply
WELL RECORD

Permit No. 31-361
Application No. 729
County Gloucester

1. OWNER Monroe Township ADDRESS Williamstown, Gloucester County, N.J.
Owner's Tell No. 4 SURFACE ELEVATION _____ Feet (Above mean sea level)
2. LOCATION Washington Ave. Pumping Station
3. DATE COMPLETED 11/12/51 DRILLER A. C. Schultes & Sons, Woodbury N.J.
4. DIAMETER: Top 12" Inches Bottom 12 Inches TOTAL DEPTH 106 Feet
5. CASING: Type Blk Steel Diameter 12 Inches Length 67' 11" Feet
6. SCREEN: Type Johnson Size of Opening .030 / .060 Diameter 12" Inches Length 41' 9" Feet
Range in Depth { Top 69 Feet Bottom 106 Feet Geologic Formation Cohansey
Tail piece. Diameter None Inches Length ✓ Feet
7. WELL FLOWS NATURALLY No Gallons per Minute at ✓ Feet above surface
Water rises to ✓ Feet above surface
8. RECORD OF TEST: Date 11/12/51 Yield 805 Gallons per minute
Static water level before pumping 12' 6" Feet below surface
Pumping level 32' 5" feet below surface after 24 hours pumping
Drawdown 20 Feet Specific Capacity 40.25 Gals. per min. per ft. of drawdown
How Pumped Turbine Test Pump How measured Orifice
Observed effect on nearby wells None
9. PERMANENT PUMPING EQUIPMENT:
Type Under another contract Capacity _____ Gallons per minute
How Driven _____ Horse Power _____ R.P.M. _____
Depth of pump in well _____ Feet Depth of Foot piece in well _____ Feet
Depth of Air Line in well _____ Feet Type of Meter on Pump _____
10. USED FOR Public Supply AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily
11. QUALITY OF WATER Good Sample: Yes ✓ No. _____
Taste None Odor None Color clear Temperature 58 °F
12. LOG See reverse (Give details on back of sheet or on separate sheet) Are samples available? No
13. SOURCE OF DATA Driller's Log
14. DATA OBTAINED BY A. C. Schultes Jr DATE 11/15/51

(Note: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

ATTACHMENT C

Log of Well

17	0	2'	Fill	Qbt — Quaternary Bridgeton Formation
	2'	6'	Brown Sand	
	6'	12'	Brown Sand & Stones	
	12'	17'	Gravel & Stones	
89'	17'	28'	Coarse Sand & Gravel	Tch — (Cohansey Formation)
	28'	33'	Fine Sand & Clay	
	33'	35'	Coarse Yellow Sand	
	35'	44'	Yellow Clay	
	44'	56'	Coarse Sand	
	56'	58'	Fine Yellow Sand	
	58'	66'	Yellow Sand	
	66'	71'	Yellow Sand	
	71'	74'	Yellow Sand	
	74'	76'	Yellow Sand	
	76'	81'	Sand & Gravel	
	81'	96'	Dark Yellow Sand Gravel	
	96'	104'	Dark Yellow Sand	
	104'	106'	Dark Brown Sand cemented	
	106'	107'	Black Muddy Clay	Tkw — Kirkwood Formation

31-32-1116

DEPARTMENT OF CONSERVATION
AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY & SUPPLY

Permit No. 31-52135
Application No. _____
County _____

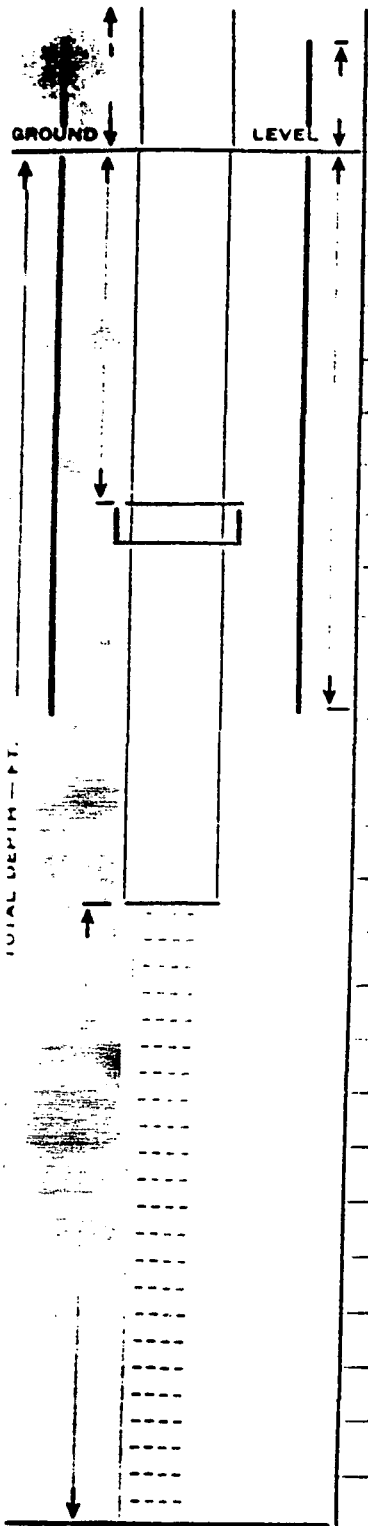
WELL RECORD

1. OWNER MONROE TOWNSHIP MUNICIPAL UTILITIES AUTHORITY ADDRESS Township of Monroe, N. J.
Owner's Well No. 5 SURFACE ELEVATION _____ Feet (Above mean sea level)
2. LOCATION Monroe Township, Gloucester Co.
3. DATE COMPLETED 1/18/67 DRILLER A. C. SCHULTES & SONS, INC.
4. DIAMETER: top 12 Inches Bottom 8 Inches TOTAL DEPTH 160 Feet
5. CASING: Type Steel Diameter 12 x 8 Inches Length 12"-121'6" 8"-126'11" Feet
6. SCREEN: Type Johnson Stain.Steel Size of Opening .060 Diameter 8 Inches Length _____ Feet
Screen - 29'8"
Cellar - 3'5"
Range in Depth { Top 126'11" Feet / Bottom 160 Feet
Geologic Formation _____
Tail piece: Diameter _____ Inches Length _____ Feet
7. WELL FLOWS NATURALLY No Gallons per Minute at _____ Feet above surface
Water rises to _____ Feet above surface
8. RECORD OF TEST: Date _____ Yield 510 Gallons per minute
Static water level before pumping _____ Feet below surface
Pumping level _____ feet below surface after _____ hours pumping
Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
How Pumped Vertical Turbine Pump (test) How measured Orifice
Observed effect on nearby wells None
9. PERMANENT PUMPING EQUIPMENT:
Type Vertical Turbine Pump Mfrs. Name Worthington
Capacity _____ G.P.M. How Driven Electric H.P. _____ R.P.M. 1800
Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Public Supply AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily
11. QUALITY OF WATER Good (pH - 4.8) Sample: Yes _____ No. _____
Taste None Odor None Color Clear Temp. _____ °F
12. LOG See Attached Are samples available? _____
(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)
13. SOURCE OF DATA Drillers Log
14. DATA OBTAINED BY A. C. SCHULTES & SONS, INC. Date 2/4/67

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements etc.)

A.C. SCHULTES & SONS — Water Well Contractors

Gravel Packed Well



WELL LOG	FEET FROM GROUND SURFACE
Fill	0 TO 4'
Sand (laminated)	4 - 8'
Sand & stones	8 - 51'
Sand (some laminated)	51 - 58'
Clay (black)	58 - 63'
Sand	63 - 66'
Clay (black)	66 - 79'
Sand	79 - 84'
Hardpan	84 - 85'
Sand	85 - 87'
Clay (laminated)	87 - 92'
Sand/thin layers clay	92 - 116'
Sand/thin layers hardpan	116 - 126'
Hardpan	126 - 127'
Very hard packed sand	127 - 155'
Fine sand	155 - 157'
Clay	157 - 160'

NAME OF OWNER: MONROE TOWNSHIP MUNICIPAL UTILITIES AUTHORITY

Well No. 2

Job No. 7194

Location Williamstown, NJ

Test Pumped (Hrs.) 9½ hrs.

Capacity G.P.M. 510

Static Level (Ground) 36'2"

Pumping Level (Ground) 82'

Specific Capacity 11

Diameter of Outer Casing 12"

Diameter of Inner Casing 8"

Dept of Well (Ground) 160

Dept to R. L. Nipple (Ground)

Depth to Gravel (Ground) 20'

Gravel Size #3

Length of Casing 12" = 121'6"

Length of Casing 8" = 126'11"

Underream Size 32

Type of Screen Johnson s/s

Size of Screen (Dia.) 8" I.D.

Top Screen Fitting Coupling

Bottom Screen Fitting Plug

Slot Size 160

Blank NO

Bags of Cement 100

Drilling Machine 1250

Date Well Completed 1/13/66

Driller Hammond

31-33-14 E1

DEPARTMENT OF CONSERVATION
AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY & SUPPLY

Permit No. 31-5150
Application No. _____
County _____

WELL RECORD

1. OWNER Violet Packing Company ADDRESS 123 Railroad Ave., Williamstown, N.J.
Owner's Well No. 31-5150 SURFACE ELEVATION 150 Feet (Above mean sea level)

2. LOCATION 123 Railroad Ave., Williamstown, N. J.

3. DATE COMPLETED 8/15/67 DRILLER J. G. Holman

4. DIAMETER: top 8 Inches Bottom 8 Inches TOTAL DEPTH 143 Feet

5. CASING: Type Black iron Diameter 8 Inches Length 123 Feet

6. SCREEN: Type Stainless steel Size of Opening .015 Diameter 8 Inches Length 20 Feet

Range in Depth { Top 115 Feet / Bottom 150 Feet } Geologic Formation _____

Tail piece: Diameter _____ Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per Minute at _____ Feet above surface

Water rises to _____ Feet above surface

8. RECORD OF TEST: Date 8/15/67 Yield 300 Gallons per minute

Static water level before pumping 27 Feet below surface

Pumping level 468 feet below surface after 3 hours pumping

Drawdown 20 Feet Specific Capacity 15 Gals. per min. per ft. of drawdown

How Pumped Turbine How measured Tank

Observed effect on nearby wells _____

9. PERMANENT PUMPING EQUIPMENT:

Type Submersible Turbine Mfrs. Name X Jacuzzi Bros.

Capacity 300 G.P.M. How Driven Electricity H.P. 20 R.P.M. 3500

Depth of Pump in well 65 Feet Depth of Footpiece in well 91 Feet

Depth of Air Line in well ____ Feet Type of Meter on Pump _____ Size ____ Inches

10. USED FOR Industrial cooling AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }

11. QUALITY OF WATER Good Sample: Yes ____ No. ____

Taste _____ Odor _____ Color _____ Temp. _____ °F

12. Log Attached Are samples available? ____
(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)

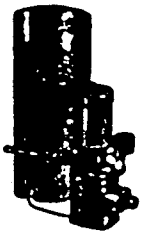
13. SOURCE OF DATA _____

14. DATA OBTAINED BY J. G. HOLMAN Date August 30, 1967

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analyses of the water, sketch map, sketch of special casing arrangements etc.)

SOUTH JERSEY DRILLING CORP.

South Delsea Drive
Vineland, New Jersey
609-692-7854



Violet Packing Company
Williamstown, New Jersey

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

Form 87

6/24/78

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Permit No. 31-1[illegible]

Application No. _____

County _____

AKA

WELL RECORD Avery Drive Test Well

1. OWNER Monroe MUA ADDRESS Main St Williamstown
   Owner's Well No. Monitoring Well SURFACE ELEVATION 150 Feet (Above mean sea level)
2. LOCATION Newberry Farms Left side of entrance - near first transformer
3. DATE COMPLETED _____ DRILLER Vance Skinner Company Inc.
4. DIAMETER: top 6 inches Bottom 4 inches TOTAL DEPTH 120 Feet
5. CASING: Type PVC. Diameter 4 inches Length 100 Feet
6. SCREEN: Type PVC Size of Opening .030 Diameter 4 inches Length 20 Feet
   Range in Depth { Top 100 Feet / Bottom 120 Feet } Geologic Formation Tcb
   Tail piece: Diameter — inches Length — Feet
7. WELL FLOWS NATURALLY No Gallons per Minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date May 24 1978 Yield 65 Gallons per minute
   Static water level before pumping 116 1/2 Feet below surface
   Pumping level 30 1/2 feet below surface after 24 hours pumping
   Drawdown 14 Feet Specific Capacity 4.6 Gals. per min. per ft. of drawdown
   How Pumped Submersible How measured 4x2 1/2 Orifice
   Observed effect on nearby wells None checked.
9. PERMANENT PUMPING EQUIPMENT:
   Type Submersible Mfrs. Name Bucks
   Capacity 60 G.P.M. How Driven Electric H.P. 3 R.P.M. 3450
   Depth of Pump in well 65 Feet Depth of Footpiece in well None Feet
   Depth of Air Line in well 65 Feet Type of Meter on Pump None Size — inches
10. USED FOR Monitoring Water Quality AMOUNT { Average — Gallons Daily / Maximum — Gallons Daily }
11. QUALITY OF WATER Good. Sample: Yes ✓ No. —
    Taste No Odor No Color No Temp. _____ °F
12. LOG See attached sheet. Are samples available? No
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)
13. SOURCE OF DATA Well Records Vance Skinner Company
14. DATA OBTAINED BY W.V. Skinner Date 1-22-79

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements etc.)

Date well completed 4-2-78 Block
First water line Lot
Water line in well Index 31-3[redacted]182
Screen—Length & Material Permit No. 31-12734
Type of Seal—Top & Bottom N/A Electric Log yes
Pump used with well 3HP Sub Water Analysis yes

0
Grovel - orange sandy & clayey
10
20
Sand pale grayish orange f to med gr.
30
coarser
40
slightly clayey
"J. stone" (6")
50
pale grayish orange sand.
slightly clayey
60
slightly clayey
70
more clayey
80
Clay grayish brown silty & sandy
more sandy
90
Sand grayish orange
100
silty & slightly clayey
uniform med gr clean sand.
110
grayish orange
120
slightly clayey
130
more clayey
140
Clay silty & sandy
150
grayish orange
160
sandy clay.
Bottom of Hole
170
180
190
grading to
200
210
220
230

BCM Betz • Converse • Murdoch • Inc.

One Plymouth Meeting Mall • Plymouth Meeting, Pennsylvania 19462 • Telephone 215 • 825-3800

FOR: Vance Skinner
P.O. Box 2
Vineland, NJ 08360

ATTENTION: Mr. William Skinner

DATE OF REPORT: 6/9/78
PAGE: 1 of 2

SAMPLES DATED: not dated
RECEIVED: 5/26/78

THE FOLLOWING REPORT COVERS THE LABORATORY EXAMINATION OF SAMPLES DELIVERED TO OUR LABORATORIES. PLEASE DO NOT HESITATE TO CONTACT US SHOULD ANY QUESTIONS ARISE.

VERY TRULY YOURS,

Pamela J. Barr
CUSTOMER SERVICES SUPERVISOR

	Monroe MVA Monitor. Well	Monroe Distant Site				
Total Solids, mg/l	143					
Chloride as Cl, mg/l	30					
Methyl Orange Alkalinity as $CaCO_3$, mg/l	5					
Sodium as Na, mg/l	15.0					
Iron as Fe, mg/l	<0.005					
Manganese, Mn, mg/l	0.051					
Nitrate as N, mg/l	1.45					
Sulfate as SO_4, mg/l	3					
Turbidity, Nephelumetric Units	0.48					
pH	4.8					
Mercury as Hg, mg/l	0.00152	0.00026				
Carbonate Hardness, ppm	40					
Non-carbonate Hardness ppm	0					

Betz · Converse · Murdoch ·

FOR: Vance Skinner
P.O. Box 2
Vineland, NJ 08360

Attn: Mr. William Skinner

DATE OF REPORT: 6/9/78
PAGE: 2 of 2

SAMPLES DATED: not dated
RECEIVED: 5/26/78

	Monroe MVA Monitor. Well	Monroe Distant Site				
Total Hardness, ppm	40					
Calcium Hardness, ppm	14					
Free Carbonic Acid (CO_2), ppm	24					
Temperature (on-site) ° F	58					
Mercury as Hg, filtered mg/l	0.00135	0.00026				

LAB 23

(609) 468-3396

VAL ASSOCIATES

P.O. Box 167

Plating Analysis & Consulting
For Electronics Industry
Water, Air & Soil Analysis

PHILIP V. DATZ, JR.
Chemist

748 Ridge Drive Road
Mantua, New Jersey 08051

June 9, 1978

Water Analysis Taken May 26 th

Monitor Well

Carbonate Hardness	- 16 ppm
Non- Carbonate	- 28 ppm
Total Hardness	- 44 ppm
Calcium Hardness	- 16 ppm
Chloride	- 36 ppm
Alklity	- P-o M-16 ppm
Carbonic Acid	- 10.[illegible] ppm
Iron	- .03 ppm
Manganese	- .11 ppm
Nitrate	- As N o3 41.4 ppm
Sulfate	- 6.[illegible] ppm
Turbutity	- 2 Formazine Turbutity Units
Sodium	- 2[illegible].8 ppm
Total Solids	- 150 ppm
pH	- 4.[illegible]

Sample Taken 5/26/78

Mercury ~~Filtered~~ - .4 ppb
PPB

Sample Taken 5/26/78

Mercury Unfiltered - .4 ppb
PPB

(609) 468-3396

VAL ASSOCIATES

P.O. Box 162

Plating Analysis & Consulting
For Electronics Industry
Water, Air & Soil Analysis

PHILIP V. DATZ, JR.
Chemist

748 Ridge Drive Road
Mantua, New Jersey 08051

June 9, 1978

Water Analysis Samples

Location - Hubert Boulavard

5/26/78 Sample Taken
Mercury Filtered - .4 ppb

5/26/78 Sample Taken
Mercury Unfiltered - .4 ppb

5/3/26 Sample Taken
Mercury - .35 ppb

5/10/76 Sample Taken (Well # 4)
Mercury - 1.6 ppb

31-33-P7

FORM 87

6/12/78

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Permit No. 31-3257

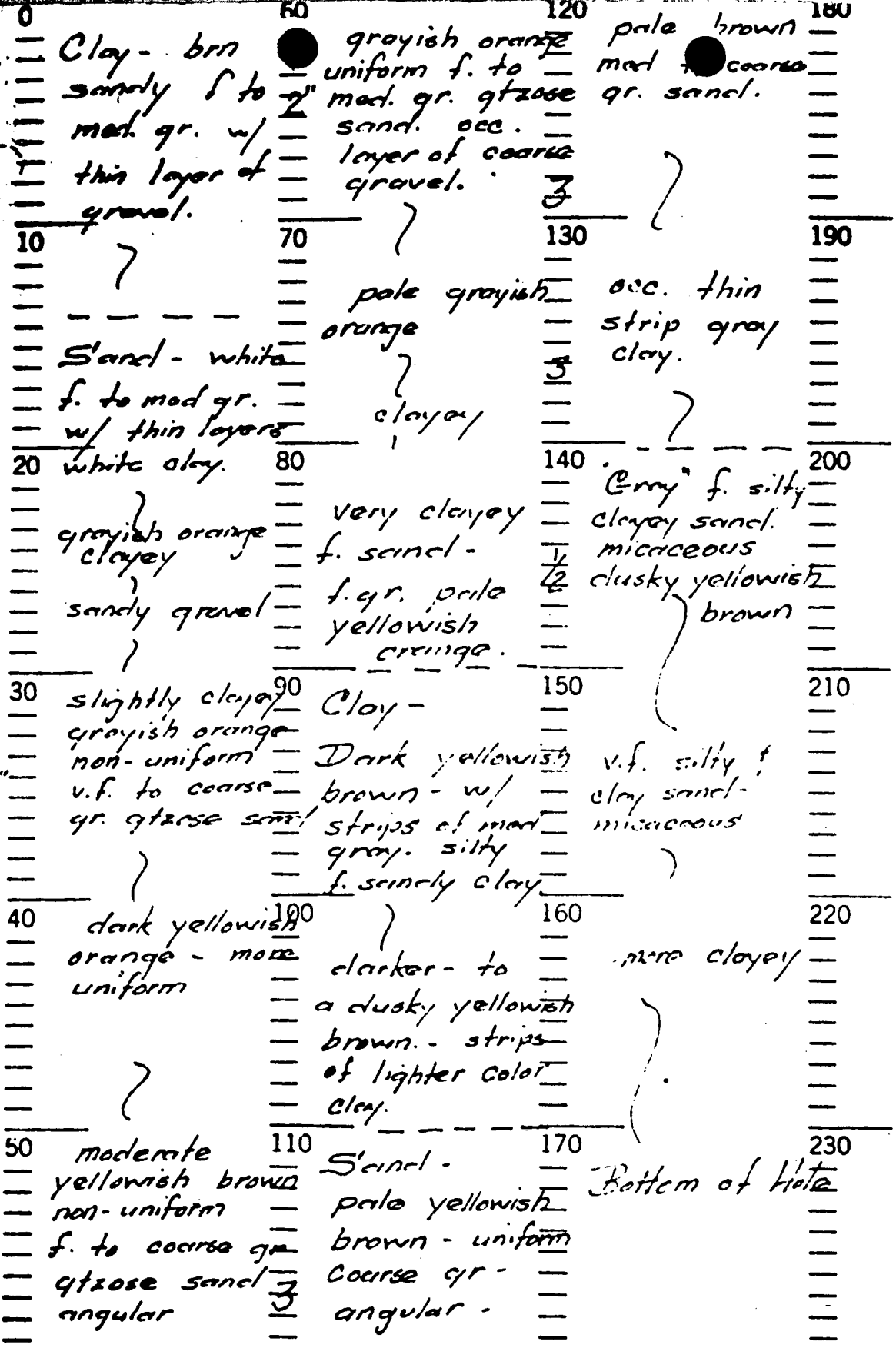
Application No. _____

County _____

WELL RECORD

1. OWNER Monroe MUA ADDRESS Main St. Williamstown.
   Owner's Well No. Pilot Well (Test Well 7) SURFACE ELEVATION ≥ 150 Feet (Above mean sea level)
   Corbary Lane.
2. LOCATION Near Water Tower
3. DATE COMPLETED _____ DRILLER Vance Skinner Company Inc.
4. DIAMETER: top 6 inches Bottom 6 inches TOTAL DEPTH 140 Feet
5. CASING: Type Steel Diameter 6 inches Length 120 Feet
6. SCREEN: Type Wire- Size of Opening .050 Diameter 6 inches Length 20 Feet
   Range in Depth { Top 120 Feet / Bottom 140 Feet } Geologic Formation Tcb
   Tail piece: Diameter None inches Length _____ Feet
7. WELL FLOWS NATURALLY No Gallons per Minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date 4/19/78 Yield 340 Gallons per minute
   Static water level before pumping 32' Feet below surface
   Pumping level 50.7 feet below surface after 72 hours pumping
   Drawdown 18.7 Feet Specific Capacity 18 Gals. per min. per ft. of drawdown
   How Pumped Turbine How measured 6x4 Orifice
   Observed effect on nearby wells Observation Well 50' distant 36.8'
9. PERMANENT PUMPING EQUIPMENT:
   Type 8" Turbine Mfrs. Name Worthington
   Capacity 750 G.P.M. How Driven Electric. H.P. _____ R.P.M. _____
   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Public Supply AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }
11. QUALITY OF WATER Good Sample: Yes ✓ No. _____
    Taste No Odor No Color No Temp. _____ °F
12. LOG See attached Sheet. Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)
13. SOURCE OF DATA Well Records - Vance Skinner Company.
14. DATA OBTAINED BY W.V. Skinner Date 1-22-79

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special cooling arrangements etc.)


0
Clay - brn sandy f to med gr. w/ thin layer of gravel.
10
Sand - white f. to med gr. w/ thin layers
20
white clay.
grayish orange clayey sandy gravel
30
slightly clayey grayish orange non-uniform v.f. to coarse gr. qtzose sand
40
dark yellowish orange - more uniform
50
moderate yellowish brown non-uniform f. to coarse gr qtzose sand angular
60
grayish orange uniform f. to med. gr. qtzose sand. occ. layer of coarse gravel.
70
pale grayish orange clayey
80
very clayey f. sand - f. gr. pale yellowish orange.
90
Clay - Dark yellowish brown - w/ strips of med gray. silty f. sandy clay
100
darker - to a dusky yellowish brown. - strips of lighter color clay.
110
Sand - pale yellowish brown - uniform Coarse gr - angular -
120
pale brown med to coarse gr. sand.
130
occ. thin strip gray clay.
140
Gray f. silty clayey sand. micaceous dusky yellowish brown
150
v.f. silty clay sand - micaceous
160
more clayey
170
Bottom of Hole
180
190
200
210
220
230

8115[illegible]

31 33 183

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Permit No. 31-14080

Application No. _____

County _____

WELL RECORD

1. OWNER MONROE TOWNSHIP ADDRESS 372 S. Main Street, Williamston, NJ

Owner's Well No. 7 SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION CORKERY LANE, WILLIAMSTOWN, NJ

3. DATE COMPLETED 2/16/79 DRILLER A. C. SCHULTES & SONS, INC.

4. DIAMETER: top 20 inches Bottom 12 inches TOTAL DEPTH 147' III' Feet

5. CASING: Type Steel Diameter 12 x 20 inches Length XXX' Feet

6. SCREEN: Type S.S. Size of Opening .045 Diameter 12" inches Length 29' Feet

Range in Depth { Top _____ Feet / Bottom _____ Feet Geologic Formation _____

Tail piece: Diameter _____ inches Length _____ Feet

7. WELL FLOWS NATURALLY 805 Gallons per Minute at _____ Feet above surface

Water rises to _____ Feet above surface

8. RECORD OF TEST: Date 2/16/79 Yield 805 Gallons per minute

Static water level before pumping 33'-9" Feet below surface

Pumping level 63-1½" feet below surface after 24 hours pumping

Drawdown 29'-4½" Feet Specific Capacity 25.1 Gals. per min. per ft. of drawdown

How Pumped VTP How measured ORIFICE

Observed effect on nearby wells N/A

TEMPORARY
~~PERMANENT~~ PUMPING EQUIPMENT:

Type VTP Mfrs. Name WORTHINGTON

Capacity 800 G.P.M. How Driven Electric Motor H.P. 60 R.P.M. 1800

Depth of Pump in well 90 Feet Depth of Footpiece in well N/A Feet

Depth of Air Line in well 90 Feet Type of Meter on Pump N/A Size _____ inches

10. USED FOR Municipal Use AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily

11. QUALITY OF WATER SATISFACTORY Sample: Yes X No. _____

Taste None Odor None Color Clear Temp. 70 °F

12. LOG ELECTRIC LOG Are samples available? NO

(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)

13. SOURCE OF DATA DRILLER'S LOG

14. DATA OBTAINED BY A.C. SCHULTES & SONS, INC. Date 9/28/79

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements etc.)

P.O. Box 1390
Trenton, NJ 08625

31 · 32 · 386

WATER WELL RECORD

Completed record must be returned 60 days after completion of well
(NJSA 58:4A-14 - 15)

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

COUNTY	TOWNSHIP OR POST OFFICE	LOT	BLOCK	PERMIT NO.
Gloucester	Monroe Twp Williamstown	2581	54	31-16229

OWNER (LAST NAME FIRST)	ADDRESS	DATE COMPLETED
Bernhard Lillian	465 Clayton Rd.	DAY 29 MO. 9 YR 2

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL COLOR	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Sand	Stones Clay	yellow		0	5
Sand.				5	10
sand & Clay				10	25
Clay				25	30
Sand.		orange		30	40

LOG?
YES ☐ NO ☐
TYPE(S)
DATE
PERFORMED BY

CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH FEET FROM	DEPTH FEET TO
2	☑ STEEL ☐ PLASTIC ☐ OTHER ☐ OPEN HOLE	040	3	31
	☐ STEEL ☐ PLASTIC ☐ OTHER ☐ OPEN HOLE			
	☐ STEEL ☐ PLASTIC ☐ OTHER ☐ OPEN HOLE			

BOREHOLE RECORD

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
8	2 INCHES	4 FEET

MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN
stainless steel	34 FEET

SIEVE ANALYSIS YES ☐ NO ☐
GRAVEL PACK YES ☐ NO ☐ SIZE

PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
0	10	Cement

LOCATION OF WELL

DISTANCE 15 FT
Replacement Well - only

PUMPING TEST

PUMPING TEST METHOD ☐ AIRLIFT ☐ PUMP ☐ BAILER
PUMPING RATE G.P.M.
DURATION OF PUMPING HOURS MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING ☐ PUMPING ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
9 FEET	FEET	FEET	FEET	FEET	FEET

FLOWING FLOW RATE G.P.M.
PUMP INTAKE SET AT FEET
WATER AT END OF TEST ☐ CLEAR ☐ CLOUDY
RECOMMENDED PUMP TYPE ☑ SHALLOW ☐ DEEP
RECOMMENDED PUMP SETTING FEET
RECOMMENDED PUMPING RATE G.P.M.
TRANSMISSIBILITY PLOT YES ☐ NO ☐

FINAL STATUS OF WELL

☑ WATER SUPPLY ☐ ABANDONED, INSUFFICIENT SUPPLY
☐ OBSERVATION WELL ☐ ABANDONED, POOR QUALITY
☐ TEST HOLE ☐ UNFINISHED
☐ RECHARGE WELL

WATER USE

☑ DOMESTIC ☐ COMMERCIAL
☐ STOCK ☐ MUNICIPAL
☐ IRRIGATION ☐ PUBLIC SUPPLY
☐ INDUSTRIAL ☐ OTHER (SPECIFY)

Form 8

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Permit No. 31-11708
Application No. _____
County _____

WELL RECORD

1. OWNER Veterans Administration ADDRESS Newark, N. J.
Owner's Well No. 62 SURFACE ELEVATION 140 Feet (Above mean sea level)
2. LOCATION Hurffville-Cross Keys Road Monroe Township
3. DATE COMPLETED 8-18-77 DRILLER M. J. Dechamps #1065
4. DIAMETER: top 1¼ inches Bottom 1¼ inches TOTAL DEPTH 55 Feet
5. CASING: Type Galv. Steel Diameter 1¼ inches Length 50 Feet
6. SCREEN: Type S.Steel Size of Opening 60 Diameter 1¼ inches Length 5 Feet
Range in Depth { Top _____ Feet / Bottom _____ Feet Geologic Formation Sand
Tail pieces Diameter _____ inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per Minute at _____ Feet above surface
Water rises to _____ Feet above surface
8. RECORD OF TEST: Date 8-18-77 Yield 15± Gallons per minute
Static water level before pumping 15' Feet below surface
Pumping level 15 feet below surface after 2 hrs. hours pumping
Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
How Pumped Dewatering pump How measured 5 gall container
Observed effect on nearby wells None
9. PERMANENT PUMPING EQUIPMENT:
Type S. W. Jet Mfrs. Name Myers
Capacity 7 G.P.M. How Driven El.Motor H.P. 1/2 R.P.M. 3450
Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Domestic AMOUNT { Average 450 Gallons Daily / Maximum 900 Gallons Daily
11. QUALITY OF WATER Good Sample: Yes X No. _____
Taste None Odor None Color Clear Temp. 55 °F
12. LOG _____ Are samples available? _____
(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)
13. SOURCE OF DATA M. J. Dechamps #1065
14. DATA OBTAINED BY M. J. Dechamps Date 8-18-77

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements etc.)

31-32-397

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Permit No. 31-13,786
Application No. _____
County _____

WELL RECORD

1. OWNER FAIRWOOD HOMES ADDRESS HADDONFIELD
   Owner's Well No. _____ SURFACE ELEVATION _____ Feet (Above mean sea level)
2. LOCATION LOT 26 BLK 54 MONROE TWP GLOUCESTER
3. DATE COMPLETED 4-2-77 DRILLER G's Water Pump
4. DIAMETER: top 4 inches Bottom 4 inches TOTAL DEPTH 60 Feet
5. CASING: Type Steel Diameter 1 inches Length 60 Feet
6. SCREEN: Type Drive Size of Opening ___ Diameter 4 inches Length 7 Feet
   Range in Depth { Top 48 Feet / Bottom 55 Feet } Geologic Formation SAND
   Tail piece Diameter 4 inches Length 5 Feet
7. WELL FLOWS NATURALLY _____ Gallons per Minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date 4-2-77 Yield 10 Gallons per minute
   Static water level before pumping 7 Feet below surface
   Pumping level 11 feet below surface after 1 hours pumping
   Drawdown 4 Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
   How Pumped _____ How measured Well Gauge
   Observed effect on nearby wells NONE
9. PERMANENT PUMPING EQUIPMENT:
   Type _____ Mfrs. Name MYERS
   Capacity 10 G.P.M. How Driven ELEC H.P. ½ R.P.M. 3450
   Depth of Pump in well 30 Feet Depth of Footpiece in well _____ Feet
   Depth of Air Line in well ___ Feet Type of Meter on Pump CANCLE Size 2 Inches
10. USED FOR HOUSE AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }
11. QUALITY OF WATER Good Sample: Yes ___ No. ___
    Taste Good Odor NONE Color CLEAR Temp. 56 °F
12. LOG _____ Are samples available? ___
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)
13. SOURCE OF DATA _____
14. DATA OBTAINED BY G's Water Pump Date 4-2-77

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated analysis of the water, sketch map, sketch of special casing arrangements etc.)

GRAVEL AND CLAY TO- 35' - MOIST.
COARSE AND FINE YELLOW SAND TO-60' WET

31 92 371

Form 87

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Permit No. 31-13960

Application No. _____

County _____

AUG 9 1978

WELL RECORD

1. OWNER Melvin Pitt ADDRESS Jones Kone Rd.

Owner's Well No. _____ SURFACE ELEVATION 00 Feet (Above mean sea level)

2. LOCATION Jones Kone Rd. Williamstown N.J. Lot 1284 Blk 1

3. DATE COMPLETED Dec 5 '78 DRILLER Jack Dunlap

4. DIAMETER: top 2 inches Bottom 2 inches TOTAL DEPTH 26 Feet

5. CASING: Type Galv steel Diameter 2 inches Length 21 Feet

6. SCREEN: Type Stainless Size of Opening 6090 Diameter 2 inches Length 5 Feet

Range in Depth { Top _____ Feet / Bottom _____ Feet Geologic Formation _____

Tail piece: Diameter _____ inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per Minute at _____ Feet above surface

Water rises to _____ Feet above surface

8. RECORD OF TEST: Date 12/15/78 Yield 5-10 Gallons per minute

Static water level before pumping 16 Feet below surface

Pumping level _____ feet below surface after _____ hours pumping

Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown

How Pumped _____ How measured _____

Observed effect on nearby wells _____

9. PERMANENT PUMPING EQUIPMENT:

Type Jet Mfrs. Name Gould

Capacity 1/2 G.P.M. How Driven elec H.P. 1/2 R.P.M. 3450

Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR Domestic AMOUNT { Average 250 Gallons Daily / Maximum 300 Gallons Daily

11. QUALITY OF WATER Good Sample: Yes X No. _____

Taste none Odor none Color Clear Temp. 58 °F

12. LOG _____ Are samples available? _____

(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)

13. SOURCE OF DATA _____

14. DATA OBTAINED BY Jack L Dunlap Date 5/17/80

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special cooling arrangements etc.)

Form 8

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Permit No. [illegible]

Application No. _____

County _____

EMERGENCY REPLACEMENT WELL

WELL RECORD

1. OWNER James Liphant ADDRESS Corkery Lane Monroe Twp.
   Owner's Well No. [illegible] SURFACE ELEVATION 110 Feet (Above mean sea level)
2. LOCATION Corkery Lane, Monroe Twp., N.J.
3. DATE COMPLETED 12/21/80 DRILLER M. J. Decharpe
4. DIAMETER: top 6 Inches Bottom 6 Inches TOTAL DEPTH 60 Feet
5. CASING: Type Steel Diameter 6 Inches Length 60 Feet
6. SCREEN: Type [illegible] Size of Opening [illegible] Diameter _____ Inches Length 10 Feet
   Range in Depth { Top _____ Feet / Bottom _____ Feet Geologic Formation _____
   Tail piece: Diameter _____ Inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per Minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date 12/21/80 Yield 25 Gallons per minute
   Static water level before pumping 24 Feet below surface
   Pumping level [illegible] feet below surface after 2 hours pumping
   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
   How Pumped Air How measured 5 gal container
   Observed effect on nearby wells None
9. PERMANENT PUMPING EQUIPMENT:
   Type [illegible] Mfrs. Name Fairbanks Morse
   Capacity [illegible] G.P.M. How Driven Electric H.P. 1 R.P.M. 3450
   Depth of Pump in well 52 Feet Depth of footpiece in well _____ Feet
   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Potable AMOUNT { Average 3500 Gallons Daily / Maximum 36000 Gallons Daily
11. QUALITY OF WATER Good Sample: Yes _____ No. _____
    Taste None Odor None Color Clear Temp. 55 °F
12. LOG Attached Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)
13. SOURCE OF DATA M. J. Decharpe
14. DATA OBTAINED BY M. J. Decharpe Date 1/10/81

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements etc.)

31-22-171 [7]

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Permit No. 31-12968
Application No. _____

WELL RECORD

OWNER Donald W. McLaughlin ADDRESS 449 BlueBell Rd.Williamstown, N.J.

Owner's Well No. 148 SURFACE ELEVATION 100 Feet (above mean sea level)

LOCATION Janvier Rd. Monroe Twp

DATE COMPLETED 10/4/78 DRILLER M.J. Dechamps

DIAMETER: top 2 Inches Bottom 2 inches TOTAL DEPTH 55 Feet

CASING: Type Galv. steel Diameter 2 inches Length 50 Feet

SCREEN: Type S. Steel Size of Opening 60 Diameter 1½ inches Length 5 Feet

Range in Depth Top _____ Feet Bottom _____ Feet Geologic Formation Sand

Tail piece: Diameter _____ inches Length _____ Feet

WELL FLOWS NATURALLY _____ Gallons per Minute at _____ Feet above surface

Water rises to _____ Feet above surface

RECORD OF TEST: Date 10/4/78 Yield 23 Gallons per minute

Static water level before pumping 10 Feet below surface

Pumping level 10 ft feet below surface after 2 hours pumping

Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown

How Pumped Dewatering pump How measured 5 gal container

Observed effect on nearby wells None

PERMANENT PUMPING EQUIPMENT:

Type S. W. Jet Mfrs. Name Fairbanks-Morse

Capacity 10 G.P.M. How Driven El. motor H.P. 1/2 R.P.M. 3450

Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ inches

USED FOR Domestic AMOUNT Average 600 Gallons Daily
Maximum 1200 Gallons Daily

QUALITY OF WATER Good Sample: Yes X No. _____

Taste None Odor None Color Clear Temp. 55 °F

LOG _____ Are samples available? _____
(Give details on back of sheet or separate sheet. If electric log as made, please furnish copy.)

SOURCE OF DATA M. J. Dechamps

DATA OBTAINED BY M. J. Dechamps Date 10/11/78

(Note: Use either side of this sheet for additions. Information such as log of materials penetrated, analysis of the water, sketch map, sketch of specific casing arrangements, etc.)

STATE OF NEW JERSEY
DEPARTMENT OF CONSERVATION
AND ECONOMIC DEVELOPMENT

DIVISION OF WATER POLICY
AND SUPPLY

SPECIAL REPORT 30

WATER RESOURCES AND GEOLOGY OF GLOUCESTER COUNTY, NEW JERSEY

Prepared in Cooperation With
United States Department of the Interior
Geological Survey

1969

ATTACHMENT D

gravel pit near Ewan show medium- to coarse-grained sand (table 2). Downdip, the formation is generally coarser grained.

The thickness of the formation ranges from 50 feet in the outcrop area to about 160 feet in the southern part of the county. The upper part of the Kirkwood Formation dips to the southeast at about 9 to 13 feet per mile and the basal beds dip about 25 feet per mile.

The Kirkwood Formation is a minor aquifer in the county. Records indicate that there are a few domestic wells, 25 to 100 feet deep which yield from 10 to 50 gpm. In and near the outcrop the formation consists largely of clay, silt, and fine sand of low permeability. Although the Kirkwood Formation is thicker and more permeable in the southern part of the county, it is not tapped by wells because water is more readily available from the overlying Cohansey Sand.

The Kirkwood Formation is of hydrologic importance in Gloucester County because its large surface area can absorb precipitation which may be transmitted to the lower aquifers. Some recharge moves downdip to the more permeable parts of the Kirkwood Formation; however, much of the recharge on the outcrop is discharged to the nearby streams.

Results of chemical analyses of water from wells 16 and 26 (table 8) in the outcrop area of the Kirkwood Formation near Richwood and Turnersville show dissolved solids of 64 and 62 mg/l, iron 0.55 and 0.43 mg/l, nitrate 22 and 14 mg/l, and hardness of 28 and 20 mg/l, respectively. Because this aquifer is recharged locally and in places hydraulically connected to underlying aquifers, contamination of the shallow water-table ground-water reservoir by infiltration of sewage, industrial wastes, or other water of poor quality should be avoided in those places.

Locally, domestic and farm supplies can be developed in and near the outcrop area. Pleistocene gravel where present in appreciable thicknesses can be developed in conjunction with the Kirkwood Formation to improve well yields.

MIOCENE(?) AND PLIOCENE(?) SERIES

Cohansey Sand

Geology

The Cohansey Sand crops out in an area of about 150 square miles in Gloucester County (fig. 2). The formation is composed of fine- to coarse-grained quartzose sand, lenses of light-colored clay as much as 25 feet thick, and lenses of gravel. The sand is white, yellow, red, brown, and gray and the clays are shades of red, orange, and gray. Generally, ferruginous cemented zones are found only near contacts with the overlying Pleistocene deposits. The Cohansey Sand usually is composed of at least 90 percent silica with subordinate amounts of feldspar, magnetite, and ilmenite. An analysis of a sample collected in a pit at Downer shows about 94 percent fine to medium sand (table 2). The Cohansey Sand dips southeast about 11 feet per mile and ranges in thickness from a few feet in the outcrop area to 130 feet at Newfield.

The Cohansey Sand is underlain by the Kirkwood Formation and overlain unconformably by the Bridgeton Formation of Pleistocene age except in a small area along Mantua Creek east of Pitman, where it is overlain by the Cape May Formation, also of Pleistocene age.

Hydrology

The Cohansey Sand is the second most productive aquifer in the county. However, the amount of water withdrawn is small compared to the quantity potentially available; thus, the aquifer is considered almost undeveloped. Locally, there may be more than one water-bearing zone present; however, the formation is generally regarded as a hydrologic unit. In and near the outcrop area, the Cohansey Sand is hydraulically connected with the underlying Kirkwood Formation. Wells tapping the Cohansey Sand range from 25 to 130 feet deep and yield up to 800 gpm.

Artesian conditions exist locally in the Cohansey Sand because of lenses of clay which act as aquicludes for the more permeable parts of the formation. Pumping tests at Williamstown and Clayton indicate a coefficient of transmissibility of 60,000 gpd per ft and a permeability of nearly 1,000 gpd per sq ft. These figures compare favorably with those for the Raritan and Magothy Formations along the Delaware River.

Recharge to the Cohansey Sand is from precipitation on the outcrop area and ground-water movement is effected to some extent by the topography. In Gloucester County, a topographic and a hydrologic ridge trending southwest to northeast from Hardingville near the Salem County line through Glassboro to Turnersville causes ground water to move northward into Raccoon Creek, Chestnut Branch, Mantua Creek, and the south branch of Big Timber Creek. This ridge is joined by a north-south-trending ridge near Cross Keys. From the high-level intake area near Cross Keys some ground water moves south and discharges into the Great Egg Harbor River and some moves west and discharges into the Maurice River or its tributaries (fig. 9).

The Cohansey aquifer is in equilibrium, or in other words, the long-term recharge equals the long-term discharge. Recharge to the aquifer during the nongrowing season exceeds aquifer discharge. Hence, the amount of water stored in the aquifer usually increases during the nongrowing season. This increase in storage is substantial enough to permit

the water table in most parts of the outcrop area to remain higher than nearby stream channels throughout the growing season. As a result, the dry-weather flow of streams in the Cohansey Sand outcrop area represents ground-water discharge. The volume of ground water discharged to streams from the Cohansey Sand as well as direct storm runoff, is measured by recording gaging stations on the Maurice River at Norma (Salem County) and on the great Egg Harbor River at Folsom (Atlantic County).

Ground water from the Cohansey Sand is utilized largely for domestic and farm supplies, although some ground water is used by industry. The 1957 ground-water pumpage from the aquifer in the county was about 2 to 3 mgd from wells generally 100 to 200 feet deep, although many wells are only 25 to 50 feet deep. The possibilities for future development of water for industry, irrigation, and public supply from the Cohansey Sand are excellent. Wells capable of yielding 1,000 gpm are possible.

The concentration of dissolved solids in ground water from the Cohansey Sand is usually less than 100 mg/l. Results of chemical analyses of six samples (table 8) show that the iron concentration was generally less than 0.5 mg/l and carbonate hardness was 50 mg/l or less. The most undesirable feature of the water is the iron content for which the water must be treated to be rendered suitable for many uses. The temperature of the water is usually between 13° and 14°C.

This aquifer consists of a large thickness of saturated sediments of high porosity and permeability. Any large-scale pumping from the aquifer may decrease the flow of the main streams, such as Great Egg Harbor and Maurice Rivers and in turn may allow increased upstream movement of saline water in the tidal reaches of the streams in Atlantic and Cumberland Counties.

PLEISTOCENE SERIES

The Pleistocene Series consists of the Bridgeton, Pensauken, and Cape May Formations. These formations have similar geohydrologic characteristics and cap the older sediments (fig. 2).

Bridgeton Formation

The Bridgeton Formation crops out in an area of about 100 square miles in the southern half of the county. The exposures are irregular and are at altitudes ranging from 100 to 160 feet.

The Bridgeton Formation contains fine- to very coarse-grained quartzose sand and gravel. An analysis of a sample collected 2 miles northeast of Mullica Hill shows more than 95 percent medium to very coarse sand (table 2). The sands are white, yellow, and brown; usually they are fairly well sorted, and the grains are subangular. The formation has a thickness of as much as 50 feet in the county.

The Bridgeton Formation yields from 10 to 50 gpm of water to wells for domestic and stock supplies. In the southern half of the county, the Bridgeton Formation is hydraulically connected with the underlying Cohansey Sand or the Kirkwood Formation. The Bridgeton Formation is a water-table aquifer and the shape of the water table is a subdued replica of the topography.

Pensauken Formation

The Pensauken Formation crops out in irregular and isolated patches in the north-central part of the county at altitudes of 40 to 120 feet. It includes an area of about 23 square miles (fig. 2). The formation consists of medium- to coarse-grained quartzose sand, and some gravel and clay. The sand grains are usually poorly sorted; subangular with colors of yellow, red, and brown. Locally, the grains of sand and gravel are indurated by ferruginous cement to form "ironstone." The Pensauken Formation is difficult to distinguish from the underlying Bridgeton Formation because of similar lithology. The formation is as much as 30 feet thick in the county. Elsewhere in the State, it attains a thickness in excess of 60 feet.

The hydrology of the Pensauken Formation is similar to that of the Bridgeton Formation. A few wells yield from 10 to 50 gpm of water for domestic use.

Cape May Formation

The Cape May Formation crops out adjacent to the Delaware River and tributary streams (fig. 2). It is found at altitudes as high as 90 feet along some streams, but usually it is not higher than 70 feet. The outcrop has an area of about 34 square miles in Gloucester County. The Cape May Formation is composed of medium- to coarse-grained quartzose sand with much gravel and minor amounts of clay. The sand and gravel are usually yellow or brown, but sometimes they are gray in color. The clays are yellow, brown, gray, and black. The materials are usually poorly sorted; and the sand grains are subangular. The Cape May materials are not compact or coated with iron oxide as are the older Pleistocene deposits. The formation is as much as 40 feet thick. Along the streams in the interior of the county, the Cape May Formation is about 30 feet thick: In some areas it is difficult to distinguish the Cape May Formation from the Pensauken Formation because of similar lithology.

Maurice River Basin

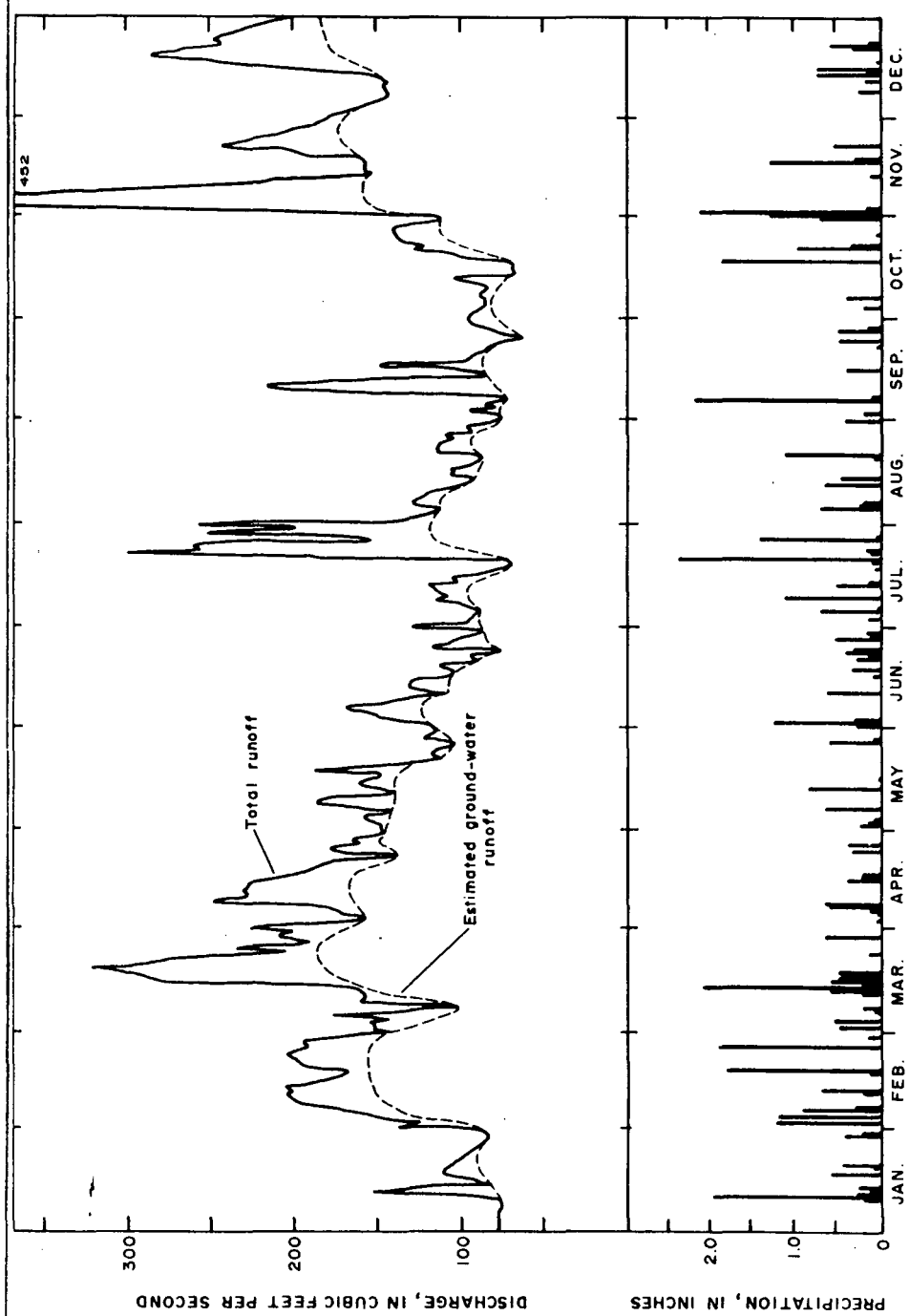
Nearly all the base flow out of the Gloucester County part of the Maurice River basin was measured at three sites (fig. 11). Still Run (table 5, site 18) was measured at Route 40, and Scotland Run and Indian Branch (table 5, sites 13 and 20) were measured upstream from Malaga Lake because the level of the lake was below the spillway at the time of the measurement (July 1957). The total measured base flow was 15.3 cfs (about 10 mgd) including 10 cfs from Still Run. These streams are tributaries of the Maurice River and derive their water from the Cohansey Sand and Pleistocene sand and gravel.

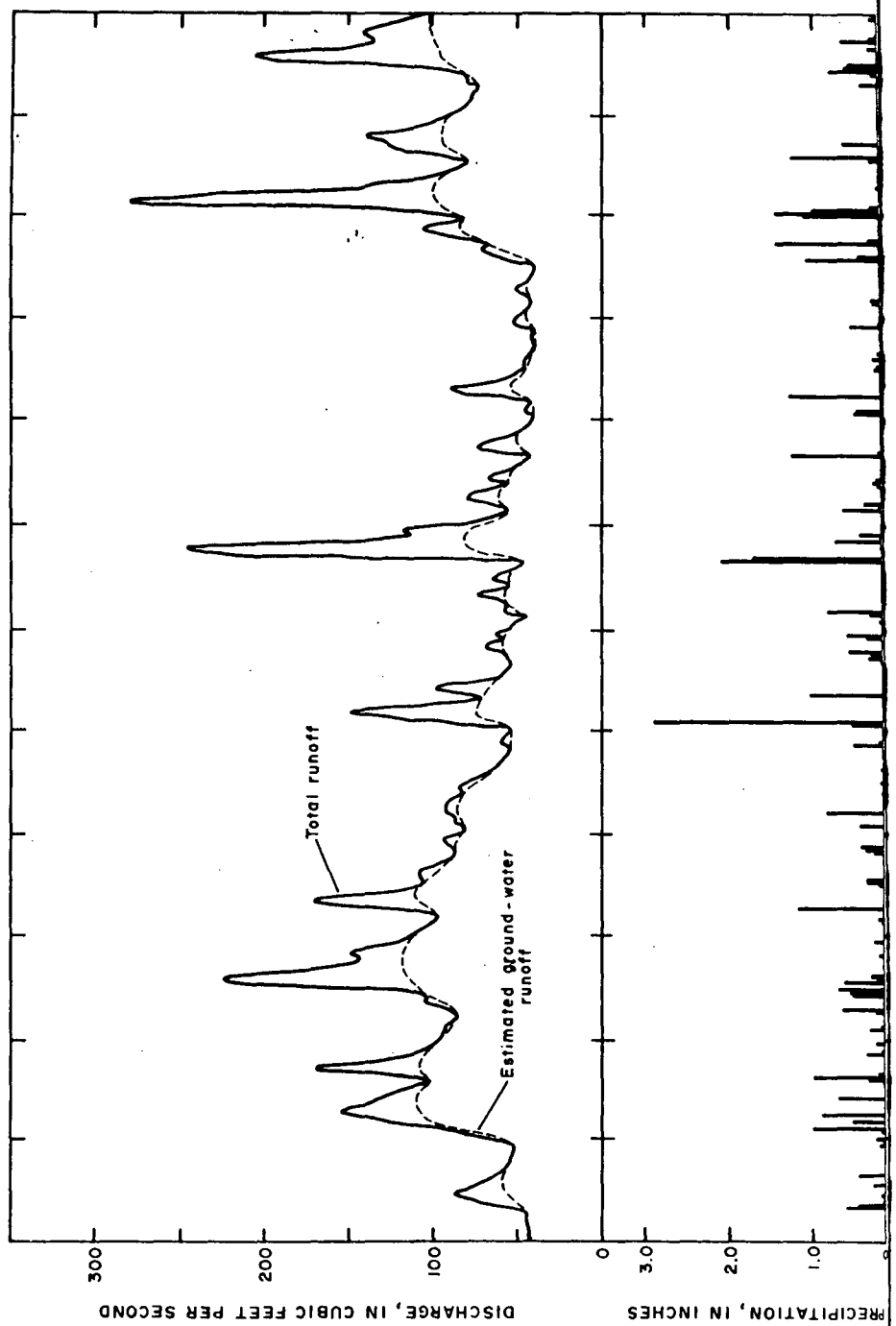
A comparison of the daily precipitation at nearby Clayton and the streamflow from the gaging station on the Maurice River at Norma for 1956 shows the rapid response to precipitation and the effects of recharge to the aquifers (fig. 14). The estimated daily ground-water discharge to the stream during 1956 ranged from about 57 to perhaps as much as 185 cfs. A hydrograph of monthly mean discharges for the 10-year period 1946-55 shows the lowest monthly flow averaged 52.0 cfs in July 1954 (fig. 13). The highest monthly flow averaged 371 cfs in February 1949. The minimum flow of record (1932-67) for 1 day was 23 cfs in 1964 and 1966 and the maximum 1 day flow was 7,360 cfs in 1940. The average discharge (1932-67) is 164 cfs.

Great Egg Harbor River Basin

The base flow from the Gloucester County part of Great Egg Harbor River basin measured near the Gloucester-Atlantic County line on July 26, 1957 was about 30 cfs or 19 mgd. This included nearly 11 cfs (7 mgd) of streamflow from Hospitality and Marsh Lake Branches which drain about 40 square miles in Gloucester County (table 5, site 16 and 17). At Berryland (table 5, site 15) the discharge of the Great Egg Harbor River was 18.8 cfs (12 mgd), of which about 10 cfs was inflow from Camden County. About 2 miles northeast of Williamstown and 8 miles upstream from Berryland, Four Mile Branch had a flow of 2.74 cfs (table 5, site 13). Excluding the inflow from Camden County, there was an increase in flow of about 6 cfs between sites 13 and 15 which is attributed to ground-water discharge and inflow from Squankum Branch and Minor drainages.

Hospitality Branch was measured near Cecil (table 5, site 14) and 4 miles downstream at Folsom (table 5, site 17). The increase in flow between the two sites was 3.21 cfs and is believed to be ground-water discharge from the Cohansey Sand and Pleistocene deposits into Faraway and White Oak Branches which are tributary to Hospitality Branch.





The gaging station at Folsom on the Great Egg Harbor River measures the streamflow from a drainage area of 56.3 square miles, of which 20 square miles are in Gloucester County. The estimated daily ground-water discharge in 1956 ranged from 39 to 120 cfs (fig. 15). A comparison of precipitation data at nearby Hammonton and daily discharge of the river at the gaging station for 1956 shows that precipitation infiltrates and moves through the aquifers and overland to the nearby streams. A hydrograph of the monthly mean discharge for the 10-year period 1946-55 shows that the lowest monthly flow averaged 20.3 cfs in September 1951 (fig. 13). The highest monthly flow averaged 178 cfs in January 1949. The maximum flow of record (1925-67) for 1 day was 1,440 cfs in 1940 and the minimum flow for 1 day was 15 cfs in 1957. The average discharge (1925-67) is 83.8 cfs.

The temperature of the water in the streams ranged from 59° to 80°F during the period of low-flow measurements of July 1957. An indication of the chemical quality of water was obtained by measuring the specific conductance. The specific conductance of the water for all the streams was 345 micromhos or less (roughly equivalent to 200 mg/l of dissolved solids). The water samples from streams flowing south in the Maurice and Great Egg Harbor River basins of Gloucester County had specific conductances ranging from 10 to 50 micromhos. This water is from the Cohansey Sand and Pleistocene sands and gravels and moves only short distances through the aquifer before it discharges into these streams. The water samples collected from streams flowing north to the Delaware River had specific conductances ranging from 100 to 345 micromhos. This water is mostly derived from the Kirkwood and Wenonah Formations and Mount Laurel Sand. Because of the low gradients of the streams, mean velocities ranged from 0.04 fps (foot per second) at Almonesson Creek to 1.38 fps at Chestnut Branch of Mantua Creek.

WATER BUDGET

An approximate long-term water-budget evaluation of the hydrologic cycle can be applied to the basins in Gloucester County. This budget can be expressed mathematically as:

$$P = Q + R + ET + S,$$

in which

P = precipitation
Q = pumpage withdrawals in the basin from aquifers that receive recharge from precipitation in the basin of interest
R = runoff, measured at gaging stations
ET = evapotransporation
S = change in storage in the water-table aquifer

If pumpage is negligible or ground water is returned to the aquifer in the drainage area above the gaging station and if the water table is in equilibrium—that is, discharge equals recharge, then the water-budget equation reduces to:

$$P = R + ET.$$

Gloucester County can expect, on the average, about 44 inches of precipitation each year (about 2 mgd per square mile). The runoff figure shown below is the average discharge for the 10-year period (1946-55) converted to million gallons per day per square mile of drainage basin. On the basis of the assumptions made, the evapotranspiration (ET) is equal to the difference between the precipitation and the runoff, or

$$ET = P - R.$$

Drainage basin	*Area (square miles)*	*Average discharge (1946-55) (cfs)*	*P — R = ET (mgd per sq mi)*
Mantua Creek at Pitman	6.75	11.7	2 — 1.12 = 0.88
Maurice River at Norma	113	167	2 — 0.95 = 1.05
Great Egg Harbor River at Folsom	56.3	87.2	2 — 1.00 = 1.00

These figures indicate that, on the average, about half of the precipitation on the drainage areas is lost to evapotranspiration and half leaves the basin as runoff. At the gaging station on Mantua Creek at Pitman, which has a small drainage area, runoff is more rapid than at Maurice River or Great Egg Harbor River stations, and thus there is probably less time for evapotranspiration. These differences are shown in the calculations.

Measurements made during July 23-31, 1957 indicate that the base flow from the 200 square miles of drainage area of the Delaware River basin in Gloucester County was about 45 cfs; and the base flow from the 130 square miles of drainage area of the Maurice and Great Egg Harbor River basins in Gloucester County was about 35 cfs. The runoff for each basin was about 0.16 mgd per square mile from base flow measured in July 1957. For the Great Egg Harbor River basin including Hospitality Branch the base flow was 0.19 mgd per square mile, and for Maurice River basin in the county it was about 0.14 mgd per square mile. The total measured base flow in July 1957 from the county was 80 cfs (about 52 mgd). This ground-water discharge is probably close to the minimum outflow from the county.

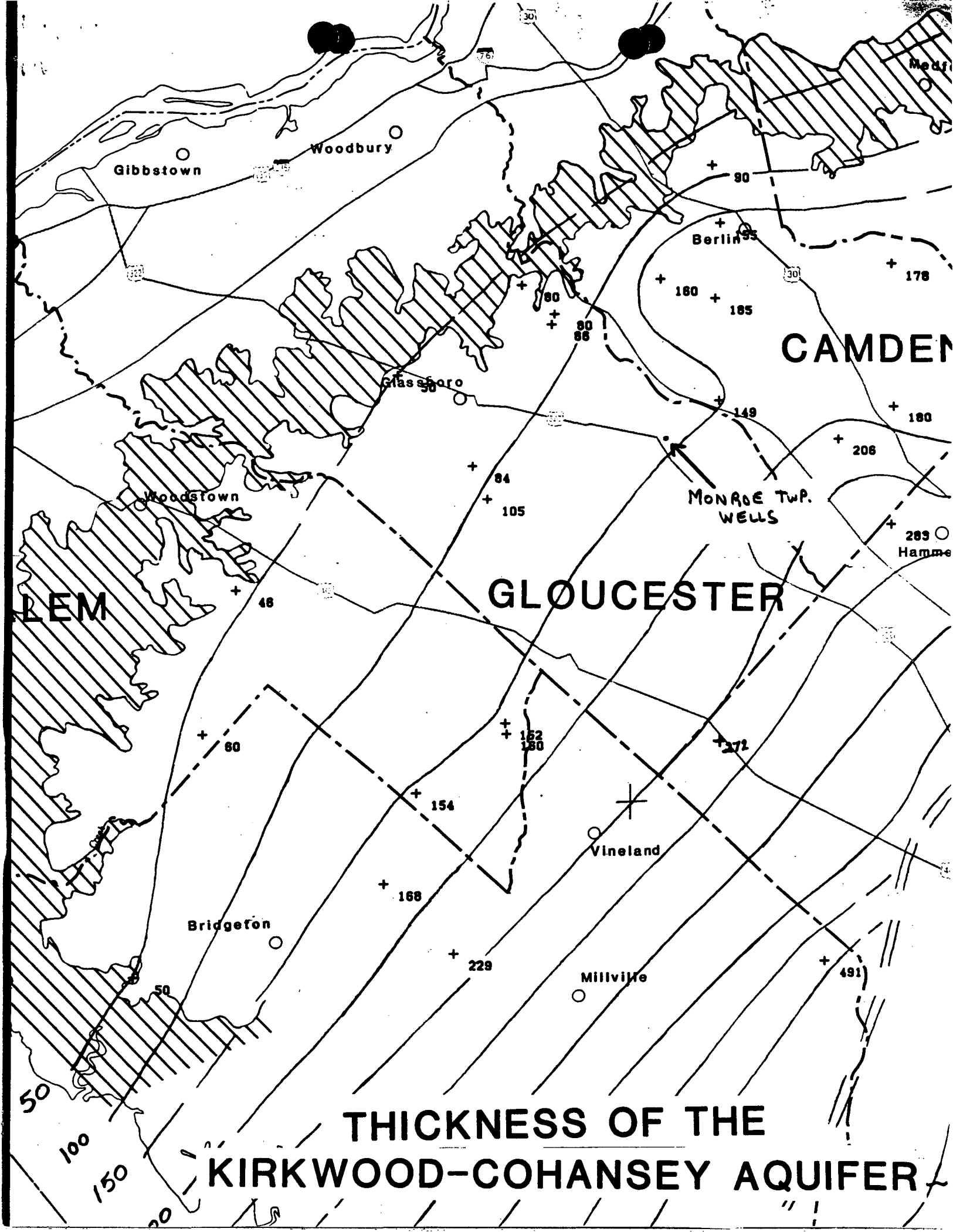
SUMMARY AND CONCLUSIONS

The future growth and economy of Gloucester County are dependent to a large extent on the available water supply. In Gloucester County nearly all of the water supplies are now derived from ground water. Surface water is not used except by a few industries adjacent to the Delaware River and by some farmers who utilize irrigation ponds. The low relief of the county and the high porosity of the surficial Coastal Plain sediments make large surface-water reservoirs impractical. Much of the streamflow is derived from ground-water discharge which can be intercepted by wells before it reaches the streams. Although large quantities of water are available from the Delaware River, the high chloride content during times of low-flow make this source unsuitable for some purposes and the future water supply for the county will probably come primarily from ground-water sources.

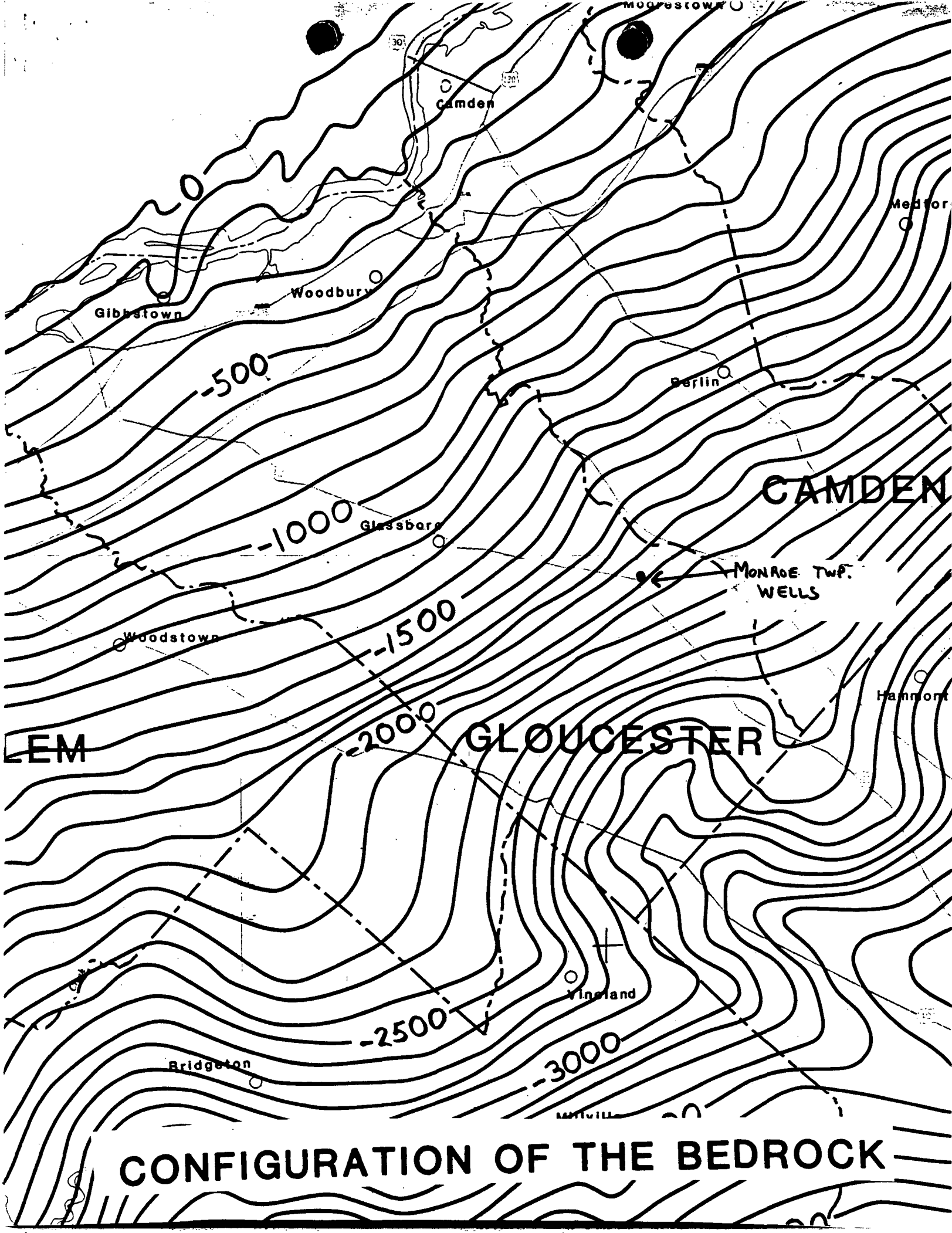
Analysis of streamflow records for the 10-year period 1946-55 of the Maurice River at Norma (Salem County) and the Great Egg Harbor River at Folsom (Atlantic County) compared with base flow measurements made in 1957 for flow to the Delaware River, indicates that about 290 mgd of water flows out of Gloucester County and parts of adjacent counties. For the 10-year period 1946-55 the lowest monthly average flow was about 95 mgd and the lowest daily outflow was about 62 million gallons. In July 1957, during the drought, about 52 mgd of outflow from the county was measured.

The base flow of the streams in Gloucester County is water that has been discharged from the aquifers. The minimum measured base flow from the county (50-60 mgd) is all ground water that has been temporarily stored in the aquifers during periods of high precipitation and which has had an opportunity to migrate to and discharge into the streams. However, during average years, much of the average streamflow of 290 mgd is derived from this source. During 1966, about 40 mgd of water was pumped from the aquifers in the county. It is thus indicated that the amount of ground-water use can be increased many-fold without endangering the perennial ground-water supply.

Most of the ground water available for use is derived from precipitation. According to records, a long-term average of about 2 mgd of water falls on each square mile in the county. About half of this amount is lost to evapotranspiration and the other half is stream runoff. Theoretically the stream runoff is what is available for use. Gloucester County has a land area of 329 square miles. Thus, theoretically, 329 mgd is available for development from all sources not counting Gloucester County's share of the Delaware River. Because of the sandy character of the surficial de-



THICKNESS OF THE KIRKWOOD-COHANSEY AQUIFER



CONFIGURATION OF THE BEDROCK

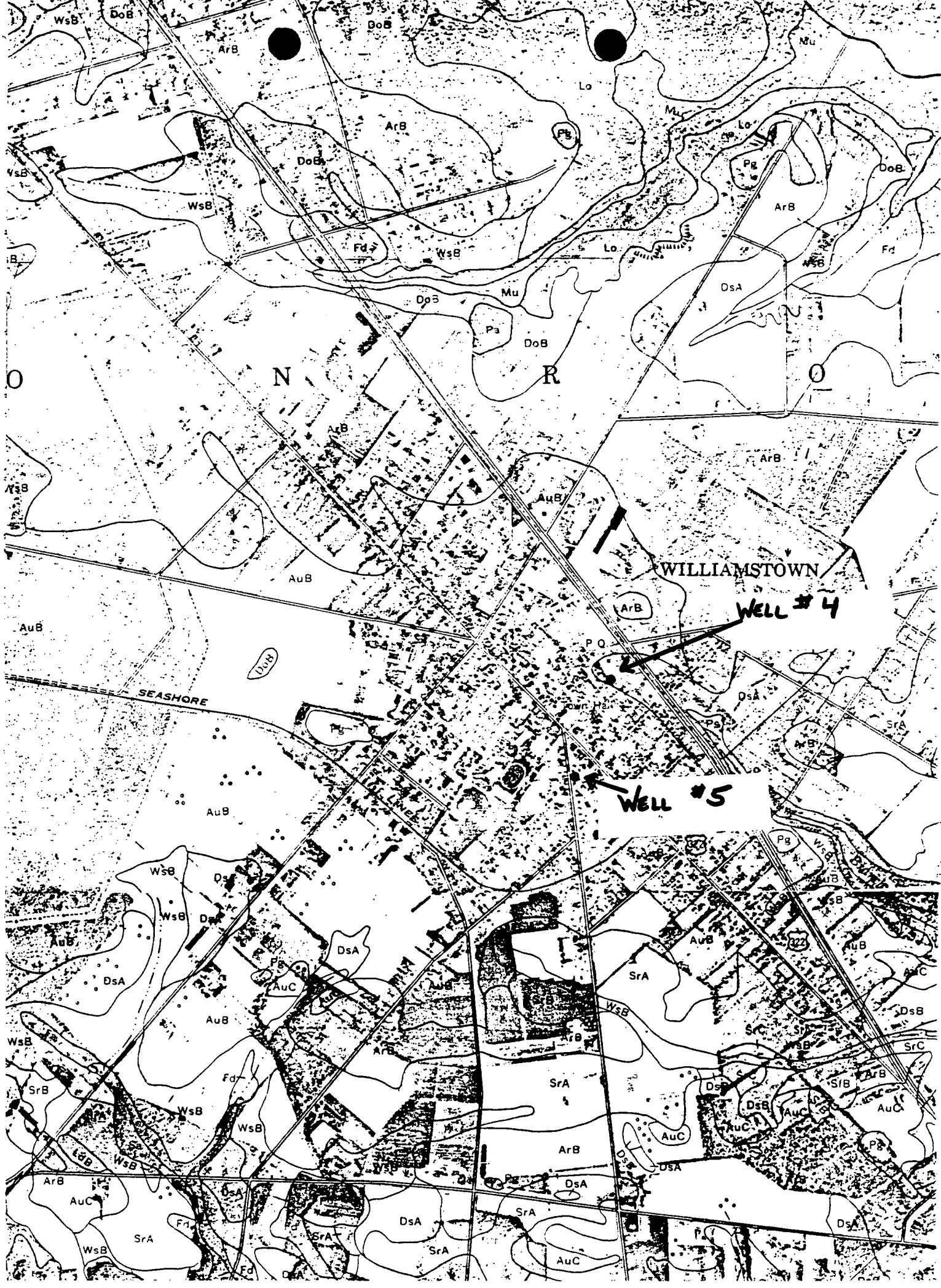
Series 1959, No. 8

Issued June 1962

SOIL SURVEY

Gloucester County New Jersey

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
NEW JERSEY AGRICULTURAL EXPERIMENT STATION


WILLIAMSTOWN
WELL #4
WELL #5
SEASHORE
0
1/2
1 Mile
Scale 1:15 840
0
5000 Feet

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL LEGEND

The first letter in each soil symbol is the initial of the soil series name. If slope forms part of the soil name, a second capital letter shows the range of steepness. Symbols without a slope letter show level or nearly level soils or land types. A number in the symbol shows an eroded soil.

SYMBOL	NAME
Ad	Alluvial land
AmB	Aura loamy sand, 0 to 5 percent slopes
ArB	Aura sandy loam, 0 to 5 percent slopes
AsB	Aura-Sassafras loamy sands, 0 to 5 percent slopes
AsC	Aura-Sassafras loamy sands, 5 to 10 percent slopes
WELL #5 AuB	**Aura-Sassafras sandy loams, 0 to 5 percent slopes**
AuC	Aura-Sassafras sandy loams, 5 to 10 percent slopes
AuC3	Aura-Sassafras sandy loams, 5 to 10 percent slopes, severely eroded
Ba	Bayboro loam
Ck	Colemantown-Matlock loams
CmB	Collington loamy sand, 0 to 5 percent slopes
CmC	Collington loamy sand, 5 to 10 percent slopes
CnA	Collington sandy loam, 0 to 2 percent slopes
CnB	Collington sandy loam, 2 to 5 percent slopes
CnC	Collington sandy loam, 5 to 10 percent slopes
CoB	Colts Neck soils, 0 to 5 percent slopes
CoC	Colts Neck soils, 5 to 10 percent slopes
DoB	Downer loamy sand, 0 to 5 percent slopes
WELL #4 DsA	**Downer sandy loam, 0 to 2 percent slopes**
DsB	Downer sandy loam, 2 to 5 percent slopes
Ek	Elkton loam
Fa	Fallsington loam
Fd	Fallsington sandy loam
FhB	Freehold loamy sand, 0 to 5 percent slopes
FhC	Freehold loamy sand, 5 to 10 percent slopes
FnB	Freehold sand, thick surface variant, 0 to 10 percent slopes
FoA	Freehold sandy loam, 0 to 2 percent slopes
FoB	Freehold sandy loam, 2 to 5 percent slopes
FoC	Freehold sandy loam, 5 to 10 percent slopes
FoC3	Freehold sandy loam, 5 to 10 percent slopes, severely eroded
FoD3	Freehold sandy loam, 10 to 15 percent slopes, severely eroded
FsD	Freehold soils, 10 to 15 percent slopes
FtE	Freehold, Colts Neck, and Collington soils, 15 to 25 percent slopes
FtF	Freehold, Colts Neck, and Collington soils, 25 to 40 percent slopes
Fw	Fresh water marsh
KpB	Keyport sandy loam, 0 to 5 percent slopes
KpC3	Keyport sandy loam, 5 to 10 percent slopes, severely eroded
KrB	Kresson sandy loam, 0 to 5 percent slopes

SYMBOL	NAME
LaA	Lakehurst sand, 0 to 5 percent slopes
LdB	Lakeland sand, 0 to 10 percent slopes
LeB	Lakewood sand, 0 to 5 percent slopes
LkA	Lenoir and Keyport loams, 0 to 5 percent slopes
Lo	Leon sand
Mc	Made land, coarse materials
Mf	Made land, fine materials
MrB	Marlton sandy loam, 0 to 5 percent slopes
MrC	Marlton sandy loam, 5 to 10 percent slopes
MrC3	Marlton sandy loam, 5 to 10 percent slopes, severely eroded
MrD	Marlton sandy loam, 10 to 15 percent slopes
MrD3	Marlton sandy loam, 10 to 15 percent slopes, severely eroded
MrE	Marlton sandy loam, 15 to 25 percent slopes
MrF	Marlton sandy loam, 25 to 40 percent slopes
Mu	Muck
NbB	Nixonton and Barclay soils, 0 to 5 percent slopes
Pa	Pasquotank fine sandy loam
Pg	Pits
Po	Pocomoke loam
Ps	Pocomoke sandy loam
Sa	St. Johns sand
SfB	Sassafras loamy sand, 0 to 5 percent slopes
SfC	Sassafras loamy sand, 5 to 10 percent slopes
SrA	Sassafras sandy loam, 0 to 2 percent slopes
SrB	Sassafras sandy loam, 2 to 5 percent slopes
SrC	Sassafras sandy loam, 5 to 10 percent slopes
SrD3	Sassafras sandy loam, 10 to 15 percent slopes, severely eroded
SsD	Sassafras soils, 10 to 15 percent slopes
SsE	Sassafras soils, 15 to 40 percent slopes
Tm	Tidal marsh
WaD3	Westphalia fine sandy loam, 10 to 15 percent slopes, severely eroded
WhB	Westphalia soils, 0 to 5 percent slopes
WhC	Westphalia soils, 5 to 10 percent slopes
WhD	Westphalia soils, 10 to 15 percent slopes
WhE	Westphalia soils, 15 to 40 percent slopes
WnA	Woodstown and Dragston loams, 0 to 2 percent slopes
WoB	Woodstown and Dragston loamy sands, 0 to 5 percent slopes
WsB	Woodstown and Dragston sandy loams, 0 to 5 percent slopes
WtB	Woodstown and Klej loamy sands, 0 to 5 percent slopes

NEW CASTLE CO

Soil map constructed 1960 by Cartographic Division, Soil Conservation Service, USDA, from 1957 aerial photographs. Controlled mosaic based on New Jersey plane coordinate system, transverse Mercator projection, 1927 North American datum.

TABLE 6.—*Brief descriptions of the soils, and their*

Map symbols	Soil type	Depth to seasonally high ground water (before artificial drainage)	Brief soil descriptions[1]	Depth from surface
				Inches
Ad	Alluvial land	1 foot	2 to 2½ feet of stream deposits of silty sand; material is variable; upper 6 inches is high in organic matter; poorly to very poorly drained.	0–30
AmB	Aura loamy sand	10 feet or more	About 1 foot of sand over 1 foot of silty sand underlain by a mixture of clayey sand and fine, angular gravel that is hard when dry; well drained.	0–16 16–30 30–60
ArB	Aura sandy loam	10 feet or more	About 2 to 2½ feet of silty sand over a mixture of clayey sand and fine, angular gravel that is hard when dry; well drained.	0–14 14–24 24–60
AsB	Aura-Sassafras loamy sands: slopes of 0 to 5 percent.	5 to 10 feet or more	Mostly like Aura loamy sand	
AsC	Aura-Sassafras loamy sands: slopes of 5 to 10 percent.	10 feet or more	Mostly like Sassafras loamy sand	
AuB	Aura-Sassafras sandy loams: slopes of 0 to 5 percent.	10 feet or more	Mostly like Aura sandy loam	
AuC	Aura-Sassafras sandy loams: slopes of 5 to 10 percent.	10 feet or more	Mostly like Sassafras sandy loam	
AuC3	Aura-Sassafras sandy loams: slopes of 5 to 10 percent and severely eroded.	10 feet or more	Mostly like Sassafras sandy loam	
Ba	Bayboro loam	Ponded at surface	About 1 foot of organic silt over 3 feet of plastic clay; very poorly drained.	0–10 10–48
Ck	Colemantown-Matlock loams	Ponded at surface	About 1 foot of organic silt over 4 feet of plastic clay; in places clay is stratified with sand below a depth of 30 inches; poorly or very poorly drained.	0–12 12–60
CmB, CmC	Collington loamy sand	10 feet or more	1½ feet of poorly graded sand over 1½ feet of clayey sand that is underlain by loose silty sand; well drained.	0–18 18–34 34–60
CnA, CnB, CnC.	Collington sandy loam	5 to 10 feet or more	About 1 foot of silty sand over 1½ feet of clayey sand that is underlain by 2½ feet of silty sand; well drained.	0–14 14–32 32–60
CoB, CoC	Colts Neck soils	10 feet or more	About 1 foot of a sand-silt mixture over 2 feet of clayey sand that is underlain by 2 feet of silty sand; material contains ironstone in places; well drained.	0–12 12–40 40–60
DoB	Downer loamy sand	5 to 10 feet	About 1½ feet of a poorly graded sand over 1 foot of silty sand; beneath this is 2½ feet of poorly graded sand that, in places, is made up of as much as 10 percent round, hard pebbles; well drained.	0–20 20–30 30–60
DsA, DsB	Downer sandy loam	5 to 10 feet	2½ feet of sand-silt mixture over 2½ feet of silty sand that, in places, contains up to 10 percent round, hard pebbles; well drained.	0–16 16–30 30–60
Ek	Elkton loam	1 foot, but surface ponded at times.	About 8 inches of inorganic silt over 4 feet of plastic clay; in places clay is stratified with sand below a depth of 30 inches; poorly drained.	0–8 8–60
Fa	Fallsington loam	1 foot	About 2½ feet of silty or clayey sand over poorly graded sand or gravelly sand; in places layers of clay occur below a depth of 30 inches; poorly drained.	0–30 30–48
Fd	Fallsington sandy loam	Same as Fallsington loam		

See footnotes at end of table.

The soils in this general area respond to fertilization, but the very sandy ones, of course, need frequent applications. Moisture relations are good except in areas where an underlying layer keeps the soil wet or in areas where the soil is so sandy that it is likely to be droughty.

Nearly all the soils that have a thick, very sandy surface layer are used for apples, peaches, or vegetables. Asparagus is the most extensive crop. Sweetpotatoes, tomatoes, peppers, eggplants, and pumpkins are other important crops.

The less sandy soils, which are more fertile and have better moisture relationships, are used for vegetables and fruits and for small grains, alfalfa hay, corn, soybeans, and pasture. Flowers and nursery stock are also grown.

If adequately drained, the naturally wet soils can be used for vegetables, soybeans, and other crops. About half the wet acreage is in forest.

Gently sloping to steep, olive clay soils: Marlton-Kresson association (MK)

This general area occurs in a broken, wavy belt, ½ to 2 miles wide. It extends from Harrisonville station in the southern part of the county northward through Mullica Hill to Blackwood Terrace. Slopes are gentle on the broad uplands between the streams that cross the area. Adjacent to the streams, the slopes are short and steep to very steep.

The soils in this general area are distinguished by the very high content of glauconite, which makes the soils and underlying material olive green or dark olive in color. The soils also have a comparatively high content of clay, although their parent materials and underlying substrata generally are somewhat friable.

The soils are moderately fertile, but water moves through them slowly. During much of the time, they are either too moist or too dry to be worked. Runoff is rapid, and the hazard of erosion is severe on cultivated slopes.

The Marlton soils occupy almost 90 percent of the area. The Kresson soil, which is wetter and more mottled, occupies most of the remaining 10 percent; it is on nearly level and depressed areas.

Where they form extensive unbroken areas, the Marlton and Kresson soils are used mainly for general crops and pasture. Smaller tracts of these soils, as well as adjacent sandy soils, are used for tomatoes, peppers, and eggplants.

This general area and the adjacent general area—gently to strongly sloping soils from greensand (FCC)—comprise the greensand belt in Gloucester County. The soils in these two general areas contain glauconite.

From 1800 to 1920, it was common for farmers to spend the winters digging, hauling, and spreading the olive clay, locally called marl, for use as fertilizer (*5*). This practice was started, of course, before soluble commercial fertilizers were generally available. The glauconite in the clay contains potash, but, because it is very slowly soluble, plants cannot obtain it easily.

Nearly level to steep, fine sandy soils: Westphalia-Nixonton-Barclay association (WNB)

The soils of this general area lie in a broken, irregular belt, 4 to 6 miles wide. This belt extends from the southern boundary of the county northward through Harrisonville, Cedar Grove, Barnsboro, and Hurffville. It is spotted by hills capped with gravelly soils.

Drainage of the area is toward the Delaware River. Many of the tributaries of the river rise in this area. Slopes generally are gentle to moderate, but, near the headwaters of streams and in other local areas, they are as much as 10 to 20 percent. The elevation ranges from 90 to 120 feet. In the higher places, the water table is below depths of 10 to 20 feet; in the lower places, it is at the surface. The high water table is a result of the slowly permeable layer of clay that, in places, underlies the fine sandy stratum from which most of the soils have formed.

The Westphalia soils occupy about 60 percent of this general soil area. Nixonton and Barclay soils, composed mainly of fine sand, are the dominant soils on the remaining 40 percent. The Westphalia, Nixonton, and Barclay soils are progressively wetter in the order named.

The soils are generally used for vegetables, fruits, and general crops. Asparagus, sweetpotatoes, and tomatoes are the most common crops. Almost half of the nurseries of the county are located in this area.

About 70 percent of the area has been cleared for farming, but forests remain on wet sites and on steep slopes along streams. The forests produce good stands of yellow-poplar, which is used locally to make produce baskets. Holly is abundant.

Gravelly soils on the higher divides: Aura-Sassafras-Downer association (ASD)

This general soil area occupies the southeastern half of the county, except where other general soil areas are interspersed. Those interspersed are inland wet soils (MAFP) along streams, and the gray sands (LLL) in the eastern corner. In addition, isolated tracts of this general area cap the higher hills in the western part of the county.

This general area constitutes the drainage divide that separates streams that flow northwestward to the Delaware River from those that flow southward and eastward. Only a very small part of the area, along its western boundary, drains to the Delaware River.

In general, the elevation ranges from 120 to 170 feet. Most of the slopes are broad and gentle. Nevertheless, along the western border and on isolated hills at the edges of the gravel deposits, there are slopes that are up to 10 percent or more.

The well-drained Aura soils occupy about 70 percent of this general soil area. The Sassafras, Downer, and other soils occupy the rest. The Aura soils have an especially firm layer, normally at depths of 24 to 36 inches, through which few roots penetrate. Sassafras and Downer soils, which are also well drained, lack this firm layer.

The Woodstown, Dragston, Fallsington, and Pocomoke soils occur less extensively in this general area. These are wet soils that have a high water table in winter.

Approximately 55 percent of the area has been cleared and is used mainly for general crops, vegetables, and fruits. This general area has broad areas of generally well-drained soils and a comparatively high altitude that favors air drainage. It is, therefore, well suited to apples and peaches. An estimated 4,000 of the more than 5,000 acres of apple and peach trees in the county occurs in this general area. Flowers are grown commercially. The main vegetables are tomatoes, asparagus, peppers, and egg-

Figure 2.—Irrigated lettuce on Aura sandy loam.

plants. In addition, lettuce, spinach, radishes, scallions, dandelions, fennel, and many other high-value crops are raised (fig. 2). Many of these crops are produced on small farms equipped with overhead irrigation.

Forests have been cut frequently for firewood and have been damaged by wildfires. The poor condition of the forests, however, does not reflect the capacity of the soils to grow trees. Pines have survived the fires in areas that formerly supported fairly good stands of oak.

Gray sands: Lakeland-Lakewood-Lakehurst association (LLL)

This small, nearly level area occurs in the eastern corner of the county, at elevations ranging from 70 to 100 feet.

The soils have developed from sands, and their surface layers have been leached gray to some extent. These soils hold little water available for plants, and commercial fertilizer washes out easily.

The Lakeland, Lakewood, and Lakehurst soils are dominant. Water enters and drains through the Lakeland and Lakewood soils at an excessive rate. The same is true of the Lakehurst soil, except that the water table rises to within 20 to 30 inches of the surface during winter and is within 4 to 6 feet during drier seasons.

All the soils are so infertile and droughty that they have not been cleared extensively for crops. Much of the cleared acreage is now idle. Sweetpotatoes, peaches, and pumpkins are grown to a minor extent. Most areas are still in forests of pitch pine.

Inland wet soils: Muck-Alluvial land-Fallsington-Pocomoke association (MAFP)

The inland wet soils occur in nearly level, narrow, wet areas along streams. Elevations range from 10 to 160 feet.

Muck makes up about 50 percent of this general soil area; Alluvial land and Fallsington, Pocomoke, and minor soils make up most of the rest. Muck and the Fallsington and Pocomoke soils are most abundant along streams that drain to the east and southeast. They also occur to a minor extent in the narrower areas that drain to the Delaware River, and in these places Alluvial land is most extensive.

Included in this general area are the Pasquotank, Bayboro, Leon, and St. Johns soils, all of which are wet to very wet.

An estimated 25 percent of the area has been cleared. The water table must be lowered in all the soils before crops can be grown. After a soil has been properly drained, corn, soybeans, summer vegetables, and pasture plants can be grown.

Forests of Atlantic white-cedar and maple grow on much of the Muck. Oak, sweetgum, maple, and other species grow on the other soils.

Descriptions of the Soils

This section describes the soil series and individual soils—mapping units—of Gloucester County. Characteristics of the soils and properties that affect use and management are given, and suitable crops are suggested.

The soil series and mapping units are arranged alphabetically. A detailed description, including a complete description of the soil profile, is given for each series. After this, there is a description of the mapping units in the series. Technical terms used in the soil descriptions are defined in the Soil Survey Manual (*9*)[1] and in the Glossary in the back part of the report. Descriptions of soil color are based on the Munsell color charts.

A list of the soils and the map symbols and capability classification of each are given in the "Guide to Mapping Units and Capability Units" at the end of the report. The approximate acreage and proportionate extent of each mapping unit are given in table 1, and the location and distribution of each are shown on the soil map in the back of the report.

Alluvial Land

Alluvial land (Ad).—This miscellaneous land type is composed of various materials. It occurs along the streams on flats that are subject to overflow. In some places it is flooded several times a year; in others, only once in several years.

Alluvial land has formed on material deposited by streams that flow west to the Delaware River. The streams begin in the gravelly divides and flow through several belts of different kinds of soils and geologic materials. They cross the general soil areas of nearly level to steep, fine sandy soils (WNB); gently to strongly sloping soils from greensand (FCC); and gently sloping, brown clay soils (KLE). Material from each of these areas has been removed and deposited on flood plains to form Alluvial land. In most places the texture of the surface layer is loam, but in some it is sandy loam.

Most areas of Alluvial land have large amounts of organic matter near the surface. Also, ground water is relatively close to the surface in most places. The soils vary from place to place but do not consist of definite horizons.

The native vegetation varies according to the texture of the soil material and the degree of wetness. Red maple

[1] Italic numbers in parentheses refer to Literature Cited, p. 83.

and Atlantic white-cedar are common in some places; sweetgum, yellow-poplar, ash, red oak, boxelder, black walnut, and redcedar grow on others. All of the soil material is extremely acid.

Nearly all the areas are in forest, but some small areas have been cleared for pasture. This land type is in capability unit VIIw–1.

Aura Series

Aura soils have a grayish-brown coarse to medium sandy loam or loamy sand surface layer. The upper subsoil is yellowish brown and is generally sandy loam or loamy sand. The deeper subsoil, beginning generally at depths of 18 to 36 inches, is noticeably reddish and more clayey. It is extremely hard when dry, commonly is firm to very firm when moist, and consists of stratified and crossbedded, coarse, harsh sand and fine gravel coated with clay. In places the clay coatings fill much of the space between the coarser particles. Much of the sand and gravel has been softened by weathering. Pebbles in the upper part of the soil are cleaner and commonly coarser than those in the lower part. The larger pebbles, more than 1 inch in diameter, are most numerous in the upper part of the profile. In the lower part, most of the pebbles are less than half an inch in diameter.

The Aura soils are well drained. They occupy the highest areas of the county. **Near Glassboro and Williamstown they are nearly level;** in the Richwood area they are more sloping. Further west, Aura soils occupy the tops of knolls.

Native woodland consists of red, white, and black oaks and some pitch pines.

Aura soils occur in association with Sassafras, Downer, and Woodstown soils. The Aura soils are redder and firmer with increasing depth than are the Sassafras and Downer soils. They are free from the mottling that is common in the subsoil of the seasonally wet Woodstown soils.

Representative profile (Aura sandy loam, 0 to 5 percent slopes, in a peach orchard one-eighth mile south of Richwood):

A_p (Plow layer). 0 to 8 inches, very dark grayish-brown (2.5Y 3/2) coarse sandy loam; weak, fine, granular structure; in places platy in the lower part; very friable; roots abundant; 10 to 15 percent of mass is rounded, clean, quartzose pebbles; worm channels common; pH 6.4; smooth lower boundary.

A_2 8 to 14 inches, yellowish-brown (10YR 5/4) coarse sandy loam; weak, fine, granular to medium, platy structure; friable to firm; roots common; worm and root channels common and filled with material from plow layer; few clean pebbles; pH 6.4; gradual, smooth lower boundary; 6 to 10 inches thick.

B_1 14 to 24 inches, dark yellowish-brown (10YR 4/4) sandy clay loam; weak, medium, subangular blocky structure; friable; about 10 percent of mass is rounded quartzose pebbles, coated with clay; a few pebbles have been softened by weathering; clay flows abundant; pH 6.2; clear, smooth lower boundary; 8 to 10 inches thick.

B_{21} 24 to 36 inches, brown (7.5YR 4/4) coarse sandy clay loam; moderate, medium, subangular blocky structure; firm, very hard when dry; small roots common; coarse fragments make up about 5 percent of mass; all fragments coated with and imbedded in clay; clay flows abundant; pebbles, both round and angular, commonly softened by weathering; ironstone fragments, one-eighth inch thick, in horizontal position at a depth of about 36 inches; sandy pockets common; pH 5.4.

B_{22} 36 to 60 inches, strong-brown (7.5YR 5/8) coarse sandy clay loam decreasing in clay with depth; massive to medium, platy structure or stratified; firm in place, friable when removed; common, sharp, gritty fine gravel imbedded in clay; weathered yellow fragments abundant; pH 4.6.

Micropodzol horizons occur in the upper 4 inches of forested soils. Areas under pitch pine have a slightly grayer surface horizon than those under hardwoods. Under native vegetation, Aura soils rarely contain earthworms.

The deeper soil generally is hard when dry. In small sandy areas, however, the soil remains loose. The depth to the firm horizon averages about 2 feet, but it ranges from about 18 to 36 inches. The subsoil normally is sandy clay loam, and, below a depth of 2 feet, it contains about 5 percent silt. Generally, below a depth of 5 feet, the soil gradually becomes less firm and more friable. Rounded quartzose pebbles are most abundant in the upper 2 feet, and usually they make up about 5 to 10 percent of the soil. In places, however, they make up as much as 30 percent.

As mapped, most areas of Aura soils contain some Sassafras and Downer soils.

Aura soils are moderately or moderately slowly permeable in the subsurface soil. Runoff is rapid, and erosion is a problem, even on gentle slopes. Irrigation water should be applied slowly. Few roots penetrate the firm deeper horizons, which hold little water that is available to plants. In places these soils contain enough pebbles to hinder disking, as well as the planting of small seeds.

The soils are low in content of organic matter and low in natural fertility, but plants grown on them respond to fertilization. They are suited to fruit, flowers, general farm crops, and most vegetables (fig. 3). Special care is needed to maintain organic matter and a good soil structure so that the soil can absorb more water.

Aura loamy sand, 0 to 5 percent slopes (AmB).—This soil has a profile similar to the one described for the series, except that the surface layer is more sandy and a few inches thicker. In uneroded areas the surface layer of this soil is 16 inches thick.

Because the surface layer is sandy, the soil warms early, but it is droughty and is subject to wind erosion

Figure 3.—**Irrigated peonies being harvested on Aura sandy loam.**

if left bare. This soil is suited to early vegetables and sweetpotatoes. Capability unit IIIs–1.

Aura sandy loam, 0 to 5 percent slopes (ArB).—This is the soil described as having a profile representative of the Aura series. In the eastern part of the county, small areas that have a loam surface layer were mapped with this soil.

Included also are small areas where erosion has removed most of the original surface layer. In these areas the soil contains little organic matter; it is stickier than normal and is, therefore, harder to plow and cultivate.

This soil is suitable for fruit, vegetables, general farm crops, and commercial flowers. It does not warm soon enough for the earliest vegetables and is not well suited to sweetpotatoes. The surface soil becomes hard when dry and, therefore, is not easily cultivated in summer. Unless the content of organic matter is maintained, the soil will crust easily and cause poor germination of seed. Runoff is rapid. Under traffic, the soil packs readily. Capability unit IIs–2.

Aura-Sassafras loamy sands, 0 to 5 percent slopes (AsB).—This complex of soils consists of areas of Aura loamy sand and of Sassafras loamy sand (described under the Sassafras series). The soils are so interspersed that it was impractical to separate them at the scale of mapping used.

The surface layer of both soils is generally grayish brown and very sandy. It is loamy sand in texture and is relatively thick. It commonly extends to a depth of 16 inches and, in places, to a depth of more than 20 inches. The subsoil is finer in texture than the surface layer. Generally the subsoil is sandy loam or sandy clay loam, but in some small areas it has a sandier texture. At depths of about 30 to 40 inches, the Sassafras soil grades to loose loamy sand or sand. At the same depths, the Aura soil grades to coarse sand and fine gravel. This Aura soil material is coated with clay and generally firm to very firm. In places there are clay lenses in the substratum.

The Aura soil is dominant on the more level areas, and the Sassafras soil is dominant on the more sloping areas. On farmed land, erosion ranges from slight to moderate.

These soils are suited to fruit, asparagus, early vegetables, and forests. Capability unit IIIs–1.

Aura-Sassafras loamy sands, 5 to 10 percent slopes (AsC).—Except for steeper slopes, this mapping unit is similar to Aura-Sassafras loamy sands, 0 to 5 percent slopes. Generally, the Aura soil occupies most of the milder slopes, and the Sassafras soil occupies most of the steeper slopes.

In most cultivated fields, erosion generally has been moderate. In small areas most of the original surface layer has been removed by erosion. Because of the clayey subsoil material in the plow layer, these spots are harder to work than areas with a normal surface layer.

These soils are suited to fruit and to asparagus and other vegetables. Wind and water erosion must be controlled on these soils. Capability unit IIIe–2.

Aura-Sassafras sandy loams, 0 to 5 percent slopes (AuB).—These soils occur in such an intricate pattern that it was not practical to separate them at the scale of mapping used. The Sassafras soil is described under the Sassafras series.

The major differences between the Aura and Sassafras soils occur below a depth of about 20 to 36 inches. At this depth, the Aura soil consists of coarse sand and gravel, which is coated with clay and is generally firm to very firm. In contrast, the Sassafras soil, below 20 to 36 inches, is more friable and sandy than at less depth. The Aura soil predominates on the more gently sloping areas, and the Sassafras soil, on the more sloping.

In some farmed areas, slight to moderate erosion has reduced the thickness of the surface layer from about 14 inches to about 8 to 12 inches. Erosion is a constant hazard, and some small areas have lost most of the original surface layer.

These soils are suited to most vegetables, fruits, and general farm crops. Capability unit IIs–2.

Aura-Sassafras sandy loams, 5 to 10 percent slopes (AuC).—For practical purposes, these intricately mixed soils have been mapped as a unit. The Sassafras soil is more extensive than the Aura. The differences in the two soils have been previously described under Aura-Sassafras sandy loams, 0 to 5 percent slopes.

In farmed areas, erosion is slight to moderate. The thickness of the surface layer has been reduced to about 8 to 12 inches. Small areas have lost most of the original surface layer, and, as a result, the plow layer is more clayey than normal. Runoff is rapid on the sloping soils of this complex; consequently, erosion is severe unless carefully controlled.

Because of runoff and the risk of erosion, contour planting is needed for peach orchards and for asparagus. The soils are suited to fruit, vegetables, and general farm crops. Capability unit IIIe–1.

Aura-Sassafras sandy loams, 5 to 10 percent slopes, severely eroded (AuC3).—These soils resemble the other Aura-Sassafras sandy loams. They have steeper slopes, however, and they have been eroded much more. The Sassafras soil is the more extensive.

Erosion has removed most of the original surface layer and exposed the more clayey subsoil. The subsoil is very low in organic matter and is harder to cultivate than the original surface layer. Gullies, 1 to 2 feet deep, occur in places. Runoff is rapid, and the risk of further erosion is severe. Crop yields are low. Capability unit IVe–1.

Barclay Series

Barclay soils have a dark grayish-brown surface soil over a mottled yellowish-brown fine sandy loam subsoil and a gray fine sandy loam substratum. The texture is uniform throughout. There is a little more clay in the subsoil than in the surface layer. The Barclay soils have formed on marine deposits of yellowish-brown, loose fine sand. This fine sand contains some mica and, in places, at least a small amount of glauconite. Prolonged wetness of the subsoil has caused the gray colors and the mottling. In farmed areas, drainage has been improved.

These somewhat poorly drained soils occupy nearly level areas. They receive runoff water and possibly undergound drainage water from adjoining higher areas. The Barclay soils are only in the area of fine sandy soils (shown by symbol WNB on the general soil map).

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spring on areas where these crops are grown. As a result, the surface layer varies in thickness.

On the stronger slopes—2 to 5 percent—water erosion is also a problem. In most fields with these slopes, the surface layer is now only 6 to 10 inches thick. Capability unit IIs–1.

Colts Neck soils, 5 to 10 percent slopes (CoC).—These soils are generally redder than normal for the series because erosion has removed some of the original brown surface horizon. The surface layer ranges from about 6 to 8 inches in thickness.

Shallow gullies are common in places where water concentrates. In some small areas, most of the surface layer has been removed. The subsoil is mixed with the surface soil when these eroded spots are plowed. The plow layer is, therefore, especially red and is more clayey than normal for the series.

These sloping soils erode easily. If erosion is controlled, they are suitable for fruits, vegetables, and general farm crops. Capability unit IIIe–1.

Downer Series

Downer soils have a grayish-brown plow layer over yellowish-brown, light sandy loam subsoil. The subsoil is underlain by sand or gravelly sand.

The soils have formed on sandy marine or stream sediments. They are most common on the terrace of the Delaware River and in parts of the eastern half of the county. These two areas are shown by symbols DWSK and ASD, respectively, on the general soil map. The **Downer soils are nearly level to gently sloping and are well drained.**

The native vegetation is a mixed forest of oak and pine.

Downer soils occur primarily in association with Klej, Aura, Sassafras, Woodstown, and Lakeland soils. They lack the firm to very firm, clay-coated sand and gravel that characteristically occur in the Aura soils below depths of 20 to 36 inches. They contain less clay in the subsoil than the Sassafras soils. The Downer soils contain more clay in the subsoil than the Lakeland and Klej soils. A more brightly colored subsoil that lacks mottling distinguishes the Downer from the Woodstown soils.

Representative profile (Downer loamy sand, 0 to 5 percent slopes, in an asparagus field one-half mile north of Hardingville):

- A_p 0 to 10 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; very friable to loose; abrupt lower boundary.
- A_2 10 to 18 inches, yellowish-brown (10YR 5/4) loamy sand; massive to weak, fine, granular structure; very friable; no coarse fragments; abrupt lower boundary.
- B 18 to 30 inches, dark yellowish-brown (10YR 4/4) sandy loam; very weak, fine, subangular blocky structure; friable; slightly sticky, nonplastic; no coarse fragments.
- C 30 to 40 inches, dark-brown (7.5YR 4/4) loamy sand; very weak, fine, granular structure; friable, nonsticky; few quartzose pebbles.
- D 40 to 50 inches, dark-brown (7.5YR 4/4) sand and gravel; single grained; loose; 30 percent of soil mass consists of coarse fragments.

In forested areas, Downer soils develop micropodzol A_2 and B_2 horizons in the uppermost 4 inches. Areas under pitch pine forest have a grayer surface soil than those under hardwood.

The texture of the subsoil ranges from loamy sand to light sandy loam but is most commonly light sandy loam.

Typically, the subsoil is little or no redder than the surface soil. The subsoil is principally yellowish brown and dark yellowish brown, but it has a faint reddish tinge. In Gloucester County, the Downer series includes soils with a thick surface layer of loamy sand and sand. These soils tend to have a more reddish tone in the subsoil than those with a sandy loam surface layer. In places the subsoil has more clay or is redder than is typical for the series.

The average thickness of the subsoil is about 14 inches, but the range is from 10 to 25 inches. In some areas gravel is scattered through the soil or is in beds generally below a depth of 24 inches.

The Downer soils are low in organic matter, clay, and natural fertility. They respond to fertilization, but, because they are sandy, fertilizer that is added will easily leach from the soils. The soils are well drained and are easily worked. They are moderately droughty, and so they are best suited to deep-rooted perennial vegetables and fruits, sweetpotatoes, and irrigated vegetables. Because of the sandy surface layer, the soils are subject to wind erosion if not protected.

Downer loamy sand, 0 to 5 percent slopes (DoB).—A profile of this soil is described as representative of the series. In some places, however, the B horizon consists of sandy loam bands, 1 inch to 2 inches thick, interspersed in 4 to 6 inches of loamy sand. Spots of Lakeland soil with very sandy subsoil are included in some areas.

Normally, the ground water is well below a depth of 30 inches. In some areas, however, it is higher during winter. Such areas are small in cropland but are large in woodland, where the survey was more generalized. In some small areas, wind or water erosion has reduced the thickness of the surface layer from about 20 inches to 14 inches or less. In other areas, especially along hedgerows, sand has drifted over the normal soil and is 1 foot or more in depth.

This soil is suited to asparagus and other deep-rooted perennials, fruits, early vegetables, and sweetpotatoes. It is easy to work and warms early in spring, but it is droughty and is easily blown. Capability unit IIs–1.

Downer sandy loam, 0 to 2 percent slopes (DsA).—The surface horizon of this soil averages between 10 and 14 inches in thickness. It is thicker in some places because of deposits from higher adjoining areas. **Ground water generally occurs at depths of 5 to 10 feet.** In some places firm layers, 1 to 2 inches thick, are in the C and D horizons. In places the subsoil is more clayey than normal.

This soil is suitable for many kinds of crops. Capability unit I–1.

Downer sandy loam, 2 to 5 percent slopes (DsB).—Except for stronger slopes, this soil is like Downer sandy loam, 0 to 2 percent slopes. It is suited to many kinds of crops. Capability unit IIe–1.

Dragston Series

Dragston soils have a dark grayish-brown surface layer, mottled in the lower part, that overlies a mottled sandy loam to sandy clay loam subsoil. The substratum is loamy sand and contains various amounts of gravel and, in places, lenses of clay. Its color in most places

TABLE 8.—*Estimated suitability of the*

Map symbols	Soil groups and soil mapping units	Individual uses			
		Building sites	Septic tanks (percolation of water below a depth of 28 inches)	Landscaping	
				Trees and shrubs	Lawns
	Group 14	Poor because of steep slopes.	Fair, but installation difficult and costly because of steep slopes.	Fair	Fair because of erosion hazard on steep slopes.
FtE	Freehold, Colts Neck, Collington soils, 15 to 25 percent slopes.				
FtF	Freehold, Colts Neck, Collington soils, 25 to 40 percent slopes.				
SsE	Sassafras soils, 15 to 40 percent slopes.				
WhE	Westphalia soils, 15 to 40 percent slopes.				
	Group 15	Poor because of steep slopes.	Poor because of slow permeability.	Fair	Fair because of erosion hazard on steep slopes.
MrE	Marlton sandy loam, 15 to 25 percent slopes.				
MrF	Marlton sandy loam, 25 to 40 percent slopes.				

Formation and Classification of Soils

This section consists of three main parts. In the first part, the formation of the soils is discussed; in the second part, the soil series are classified by great soil groups; and in the third part, the results of soil analyses of two soil types are given.

Formation of the Soils

The important factors of the environment that have influenced the formation of the soils of Gloucester County are (1) parent material, (2) climate, (3) topography, (4) biological activity, and (5) time. A discussion of these factors follows.

Parent material

All the soils of Gloucester County have formed on unconsolidated beds of either sand or clay mixed with silt or gravel. These beds were laid down in a succession of ocean or river deposits. At times the water was deep; at other times it was shallow. In addition, the beds were tilted to the southeast. The elevation of the land increase in a southeasterly direction from the Delaware Rive (fig. 13).

Following the withdrawal of the ocean at differen periods, there was a vast amount of wind and water erosio on the barren land. Although glaciers did not reach a far south as this county, it is believed that water fro melting glaciers covered most of the county. Certainl the climate of the area was affected by the great ice shee that came within 70 miles of the northern border of t county.

The main geologic formations and the soil series d veloped from them are listed in table 9. This table giv characteristics of the formations and shows the differe degrees of drainage under which the soils have develope Blank spaces on table 9 indicate that a soil of the giv drainage class on the formation named is not present significant areas in this county. Except where t geologic materials are mixed, there is much relationshi between geologic formation and the soil that has forme

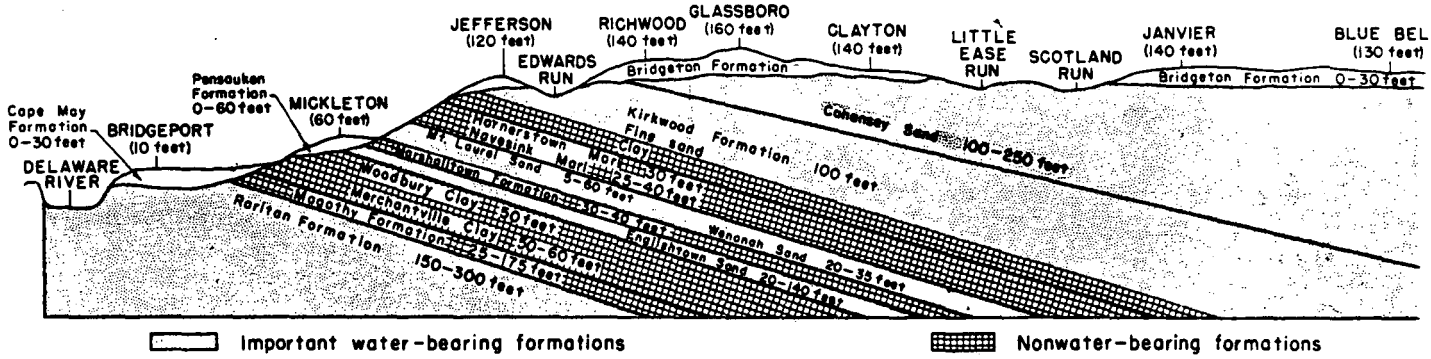


***Figure 13.*—Section from the Delaware River to Blue Bell showing the main geologic formations and their thicknesses. Vertical scale exaggerated. Sketch is based on "Geologic Map of New Jersey" (*4*) and Bulletin 50, "The Geology of New Jersey" (*3*).**

TABLE 9.—*Geologic formations, some of their characteristics,*

Geologic formations [1]	Thickness	Probable yield of well water	Type of clay	Soils developed
				Excessively drained
	Feet	*Gallons per minute*		
Cape May formation	0–30	(2)		
Pensauken formation	0–60	(2)		
Bridgeton formation	0–30	(2)		
Cohansey sand	**100–250**	5–100	Kaolinite, some illite	Lakewood, Lakeland
Kirkwood formation:				
Fine sand	100	10–50		
Clay			Illite	
Vincentown sand	25–100			
Hornerstown marl [3]	30			
Navesink marl [3]	25–40			
Mt. Laurel sand	5–60	10–200		
Wenonah sand	35–20			
Marshalltown formation	30–40		Illite	
Englishtown sand	20–140	20–100		
Woodbury clay	50		Illite	
Merchantville clay	50–60			
Magothy formation	25–175			Not exposed at the surface
Raritan formation	150–300	10–1, 400		

[1] Listed in order, from youngest to oldest formation.

[2] In places small, shallow wells provide a moderate supply of water.

Westphalia soils have a distinct subsoil of fine sandy loam, and, under pines, Lakewood soils consist of loose fine sand. Field tests have not shown any significant difference in the acidity of soils developed under hardwoods or pines.

Since most undisturbed soils in upland woodlands contain very few earthworms, there is a minimum of soil mixing before the soil is limed and fertilized. Ants, termites, and, in places, the cicada are probably most active in destroying soil horizonation. In places ants bring up yellowish-brown subsoil almost as fast as rainfall bleaches the sand grains at the surface.

Time

In most of the soils of the county, including those developed in young material (an estimated 15,000 years old) along the Delaware River, there has been sufficient time and rainfall to leach out of most of the readily soluble bases and thus make the soil strongly acid in reaction. Movement of clay out of the A horizon and into the B horizon has progressed far enough so that the increase of clay is apparent in the subsoil. These processes have had time to occur in all the soils except those developing in very recent alluvium.

The estimated maximum age (about 150 million years) of the oldest geological material is really of little significance to soil-forming processes because of the length of time that this material was covered by water or by other geologic beds.

Classification of Soil Series by Great Soil Groups [6]

In this section the soil series of the county have been placed in a higher category of classification—the great soil group. A great soil group is a broad group of soils, all of which have the same general chemical and physical properties and sequences of horizons.

Gray-Brown Podzolic soils

This great soil group consists of soils that have a comparatively thin organic covering and organic-mineral layers over a grayish-brown leached layer that rests upon an illuvial brown horizon. The soils appear to have developed under a deciduous forest in a temperate, moist climate.

Gray-Brown Podzolic soils intergrading to Red-Yellow Podzolic soils.— Unplowed areas of these soils have a thin covering of humus, an inch to a few inches thick; an A_1 horizon, stained with organic matter, 2 to 4 inches thick; a yellowish-brown or grayish-brown A_2 horizon that is slightly leached; and a textural B horizon of accumulated clay that is brown, strong brown, or yellowish brown (olive brown or olive in parts of the county where there is a considerable amount of glauconite in the soil). Under natural conditions, these soils have a pH of below 5.0.

[6] GRANVILLE A. QUAKENBUSH, State soil scientist for New Jersey, helped to prepare this section.

and soils that have developed from them

Soils developed—Continued				
Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
Sassafras, Downer	Klej, Woodstown	Klej, Dragston	Fallsington	Pocomoke.
Sassafras, Aura	Woodstown	Dragston	Fallsington	Pocomoke.
Aura, Sassafras, Downer.	Woodstown	Dragston	Fallsington	Pocomoke.
Downer	Lakehurst, Klej, Woodstown.	Lakehurst, Klej, Dragston.	Leon, Fallsington	St. Johns, Pocomoke.
Westphalia	Nixonton	Barclay	Pasquotank	
	Keyport	Lenoir	Elkton	Bayboro.
Freehold				
Marlton	Marlton	Kresson	Colemantown	Matlock.
Freehold				
Collington, Colts Neck				
Freehold				
in Gloucester County				

[3] This material, called marl, is highly glauconitic.

TABLE 10.—*Soil series arranged according to subsoil texture and natural drainage*

Subsoil texture [1]	Natural drainage classes					
	Excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	Uniform colors to a depth of 30 inches; loamy sand or sand B horizon	Uniform colors to a depth of 30 inches; sandy loam or more clayey B horizon	Uniform colors to a depth of 20 inches; mottled colors or distinctly paler colors between depths of 20 and 30 inches	Dark grayish-brown surface layer; mottled colors or distinctly paler color between depths of 10 and 20 inches	Dark-gray surface layer; light-gray or olive subsoil, with or without mottling	Nearly black surface layer; light-gray or olive subsoil, with or without mottling
Sand or loamy sand (nonglauconitic).	Lakewood, Lakeland.		Lakehurst, Klej.	Lakehurst, Klej.	Leon	St. Johns.
Sandy loam to sandy clay loam:						
Nonglauconitic material		Downer, Sassafras, Aura.	Woodstown	Dragston	Fallsington	Pocomoke.
Glauconitic material:						
Fine sandy loam		Westphalia	Nixonton	Barclay	Pasquotank	
Medium sandy loam to sandy clay loam.		Collington, Colts Neck, Freehold.				
Clay:						
Nonglauconitic material			Keyport	Lenoir	Elkton	Bayboro.
Glauconitic material		Marlton	Marlton	Kresson	Colemantown	Matlock.

[1] Subsoil texture listed in order of increasing content of clay.

HYDROGEOLOGIC FRAMEWORK OF THE NEW JERSEY COASTAL PLAIN

REGIONAL AQUIFER-SYSTEM ANALYSIS

U.S. GEOLOGICAL SURVEY
Open-File Report 84-730

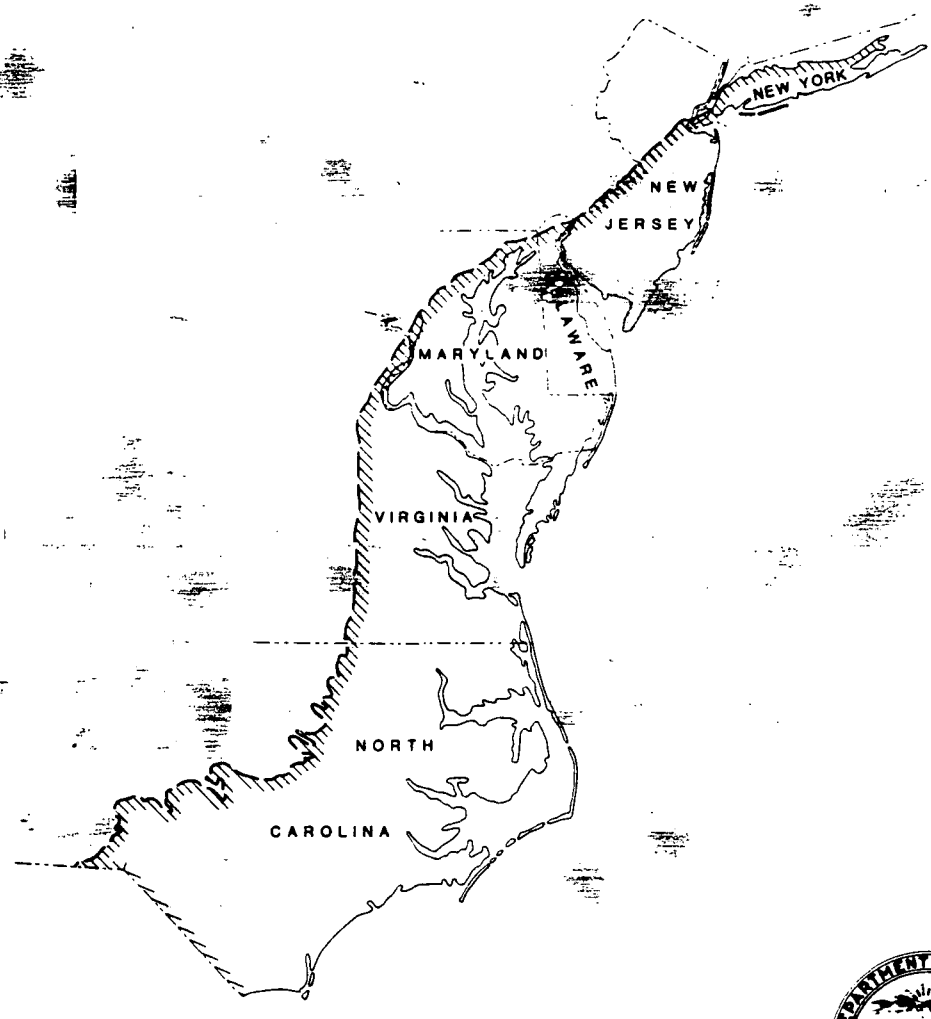


Table 2. Geologic and hydrogeologic units in the Coastal Plain of New Jersey.

SYSTEM	SERIES	GEOLOGIC UNIT	LITHOLOGY	HYDROGEOLOGIC UNIT	HYDROLOGIC CHARACTERISTICS
Quaternary	Holocene	Alluvial deposits	Sand, silt, and black mud.	Undifferentiated	Surficial material, often hydraulically connected to underlying aquifers. Locally some units may act as confining beds. Thicker sands are capable of yielding large quantities of water.
		Beach sand and gravel	Sand, quartz, light-colored, medium- to coarse-grained, pebbly.		
	Pleistocene	Cape May Formation	Sand, quartz, light-colored, heterogeneous, clayey, pebbly.		
Tertiary	Miocene	Pensauken Formation			
		Bridgeton Formation			
		Beacon Hill Gravel	Gravel, quartz, light colored, sandy.	Kirkwood-Cohansey aquifer system	A major aquifer system. Ground-water occurs generally under water-table conditions. In Cape May County the Cohansey Sand is under artesian conditions.
		Cohansey Sand	Sand, quartz, light-colored, medium to coarse-grained, pebbly; local clay beds.		
		Kirkwood Formation	Sand, quartz, gray and tan, very fine- to medium-grained, micaceous, and dark-colored diatomaceous clay.	confining bed / Rio Grande water-bearing zone[1] / confining bed	Thick diatomaceous clay bed occurs along coast and for a short distance inland. A thin water-bearing sand occurs within the middle of this unit.
				Atlantic City 800-foot sand	A major aquifer along the coast.
				Composite confining bed	Alloway Clay member or equivalent
	Eocene	Piney Point Formation	Sand, quartz and glauconite, fine- to coarse-grained.	Piney Point aquifer	Yields moderate quantities of water locally.
		Shark River Formation	Clay, silty and sandy, glauconitic, green, gray and brown, fined-grained quartz sand.		Poorly permeable sediments.
		Manasquan Formation			
	Paleocene	Vincentown Formation	Sand, quartz, gray and green, fine- to coarse-grained, glauconitic, and brown clayey, very fossiliferous, glauconite and quartz calcarenite.	Vincentown aquifer	Yields small to moderate quantities of water in and near its outcrop area.
		Hornerstown Sand	Sand, clayey, glauconitic, dark green, fine- to coarse-grained.		Poorly permeable sediments.
Cretaceous	Upper Cretaceous	Tinton Sand	Sand, quartz, and glauconite, brown and gray, fine- to coarse-grained, clayey, micaceous.	Red Bank sand[2]	Yields small quantities of water in and near its outcrop area.
		Red Bank Sand			
		Navesink Formation	Sand, clayey, silty, glauconitic, green and black, medium- to coarse-grained.		Poorly permeable sediments.
		Mount Laurel Sand	Sand, quartz, brown and gray, fine- to coarse-grained, slightly glauconitic.	Wenonah-Mount Laurel aquifer	A major aquifer.
		Wenonah Formation	Sand, very fine- to fine-grained, gray and brown, silty, slightly glauconitic.		
		Marshalltown Formation	Clay, silty, dark greenish gray, glauconitic quartz sand.	Marshalltown-Wenonah confining bed	A leaky confining bed.
		Englishtown Formation	Sand, quartz, tan and gray, fine- to medium-grained, local clay beds.	Englishtown aquifer system	A major aquifer. Two sand units in Monmouth and Ocean Counties.
		Woodbury Clay	Clay, gray and black, micaceous silt.	Merchantville-Woodbury confining bed	A major confining bed. Locally the Merchantville Fm. may contain a thin water-bearing sand.
		Merchantville Formation	Clay, glauconitic, micaceous, gray and black; locally very fine-grained quartz and glauconitic sand.		
		Magothy Formation	Sand, quartz, light-gray, fine- to coarse-grained; local beds of dark-gray lignitic clay.	Potomac-Raritan-Magothy aquifer system: upper aquifer	A major aquifer system. In the northern Coastal Plain the upper aquifer is equivalent to the Old Bridge aquifer and the middle aquifer is the equivalent of the Farrington aquifer. In the Dela. River Valley three aquifers are recognized. In the deeper subsurface, units below the upper aquifer are undifferentiated.
		Raritan Formation	Sand, quartz, light-gray, fine- to coarse-grained, pebbly, arkosic, red, white, and variegated clay.	conf bd / middle aquifer	
	Lower Cretaceous	Potomac Group	Alternating clay, silt, sand, and gravel.	conf bd / lower aquifer	
Pre- Cretaceous		Bedrock	Precambrian and lower Paleozoic crystalline rocks, metamorphic schist and gneiss; locally Triassic basalt, sandstone and shale.	Bedrock confining bed	No wells obtain water from these consolidated rocks, except along Fall Line.

[1] Rio Grande water-bearing zone.

[2] ------ Minor aquifer not mapped in this ------ report.

Modified from Seaber, 1965, table 3.

and structure contour maps of this unit are not given in this report. Tops and thicknesses of the Rio Grande water-bearing zone can be calculated from the hydrogeologic sections.

The Rio Grande water-bearing zone is utilized mainly in southern Cape May County, where aquifer thicknesses can exceed 100 ft. It is generally less than 40 ft thick throughout much of the coastal areas in southern Ocean and Atlantic Counties. The aquifer is seldom used outside of southern Cape May County and is of minor importance. Therefore, in this report, the Rio Grande water-bearing zone has been included as part of the confining bed overlying the 800-foot sand shown on plate 22.

Kirkwood-Cohansey Aquifer System

The Kirkwood-Cohansey aquifer system is predominantly a water-table aquifer that underlies an area of approximately 3,000 mi^2 southeast of the updip limit of the outcrop of the Kirkwood Formation. This aquifer system is composed of the Kirkwood Formation, Cohansey Sand, and, depending on location, can include overlying deposits of the Beacon Hill Gravel, Bridgeton Formation, and Cape May Formation (Rhodehamel, 1973). The Kirkwood-Cohansey aquifer system is confined by overlying Pleistocene deposits on the peninsular part of Cape May County.

The lithology of the Kirkwood Formation, as indicated previously, is variable. Along coastal areas thick clay beds are dominant with interbedded zones of sand and gravel. In the subsurface, updip from the coast, fine to medium sand and silty sand are common, and regionally extensive clay beds occur only in the basal part of the formation.

The Cohansey Sand, also of Miocene age, is coarser grained than the underlying Kirkwood Formation. It is predominantly a light-colored quartz sand containing minor amounts of pebbly sand, fine- to coarse-grained sand, silty and clayey sand, and interbedded clay (Rhodehamel, 1973, p. 24). Some local clay beds within the Cohansey Sand are relatively thick. Locally, perched water tables and semiconfined conditions can exist in the Kirkwood-Cohansey aquifer system.

Overlying the Cohansey Sand are the Beacon Hill Gravel and the Bridgeton Formation, both considered to be Miocene fluvial deposits (Owens and Minard, 1979). The Beacon Hill Gravel overlies the Cohansey Sand only in remnant patches on the highest hills between Clarksburg, Monmouth County, and Warren Grove, Ocean County, where it can be as much as 40 ft thick (Owens and Minard, 1979, p. D6). The coarse-grained sand and gravel of the Bridgeton Formation are more widespread and can generally add 30 to 50 ft of thickness to the aquifer system in parts of Camden, Gloucester, Salem, Cumberland, Atlantic, and Cape May Counties (Owens and Minard, 1979, p. D14).

Throughout most of Cape May County, the Pleistocene Cape May Formation directly overlies the Cohansey Sand. Gill (1962, p. 21) divided the Cape May Formation into four distinct environmental facies. In order of deposition they are: estuarine sand, estuarine clay, marine sand, and deltaic sand. Gill (1962, fig. 2) has shown that in the northern half of Cape May County and along the coast as far south as Stone Harbor, the Cohansey Sand is in hydraulic connection with the overlying marine and deltaic sand facies. The marine sand facies of the Cape May Formation adds as much as 100 ft to the thickness of the Kirkwood-Cohansey aquifer system in the northern half of Cape May County. On the peninsular part of Cape May County, the Cohansey Sand is generally in hydraulic connection with the estuarine sand facies but is confined by the overlying estuarine clay facies (Gill, 1962, fig. 2). The estuarine clay facies generally ranges from 25 to 125 ft in thickness (Gill, 1962, p. 27).

The base of the Kirkwood-Cohansey aquifer system is shown on plate 23. The map illustrates two major regional basal surfaces for the water-table aquifer. The two surfaces are differentiated by the double-dashed line representing the approximate westward limit of the major confining bed overlying the Atlantic City 800-foot sand. The basal surface for the Kirkwood-Cohansey aquifer system west of this line is the top of the clay bed lying within the lower part of the Kirkwood Formation. This clay bed, as shown on hydrogeologic sections F-F' (pl. 4) and L-L' (pl. 5), is the updip extension of the confining bed underlying the 800-foot sand, and is probably the equivalent of the Alloway Clay Member of the Kirkwood Formation described by Nemickas and Carswell (1976).

The basal surface east of the double-dashed line is the top of the thick diatomaceous clay bed that overlies the Atlantic City 800-foot sand. The discontinuity in the structure contours on the base of the unconfined system at the double-dashed line is caused by the presence of this clay bed. The base of the aquifer system directly updip from the northwestern limit of the confining bed generally lies more than 350 ft below sea level. At Egg Harbor City, Atlantic County, several miles downdip from the western limit of the confining bed, the base of the water-table aquifer is only 160 ft below sea level. The difference in altitudes of the two basal surfaces of the Kirkwood-Cohansey aquifer system is shown diagrammatically in figure 5.

The thickness of the confining bed underlying the Kirkwood-Cohansey aquifer system west of the double-dashed line is shown on plate 18 as the composite confining bed. If, in more detailed studies, the Vincentown and Piney Point aquifers are considered to be important, the thickness of the confining bed between the base of the unconfined aquifer and these minor aquifers can be calculated by comparing the maps of the tops of the Vincentown (pl. 19) and Piney Point (pl. 20) aquifers with the base of the Kirkwood-Cohansey aquifer system west of the double-dashed line (pl. 23).

It is important to note that the Cohansey Sand is a confined aquifer beneath the peninsular portion of Cape May County. However, on plate 23, structure contours have been extended throughout Cape May County to illustrate the base of the confined Cohansey Sand. Information regarding the water-table system in Cape May County can be found in Gill (1962).

The extent of the confining bed overlying the Atlantic City 800-foot sand partly determines the thickness of the Kirkwood-Cohansey aquifer system. An abrupt change in the thickness of the Kirkwood-Cohansey aquifer system at the double-dashed line is shown on plate 24. The water-table aquifer thickens downdip from less than 50 ft at the Kirkwood outcrop to more than 400 ft near the edge of the upper confining bed of the Atlantic City 800-foot sand. In areas where this clay bed occurs in the subsurface, the aquifer thickness ranges from about 140 ft along the northwestern extent of the clay bed to approximately 400 ft in the Atlantic City area.

The aquifer-thickness map for the Kirkwood-Cohansey aquifer system represents not only the saturated thickness of the water-table aquifer but also the unsaturated section. The thickness of the aquifer at each control point represents the total thickness of the unit calculated by subtracting the depth of the basal confining bed from the altitude of land surface.

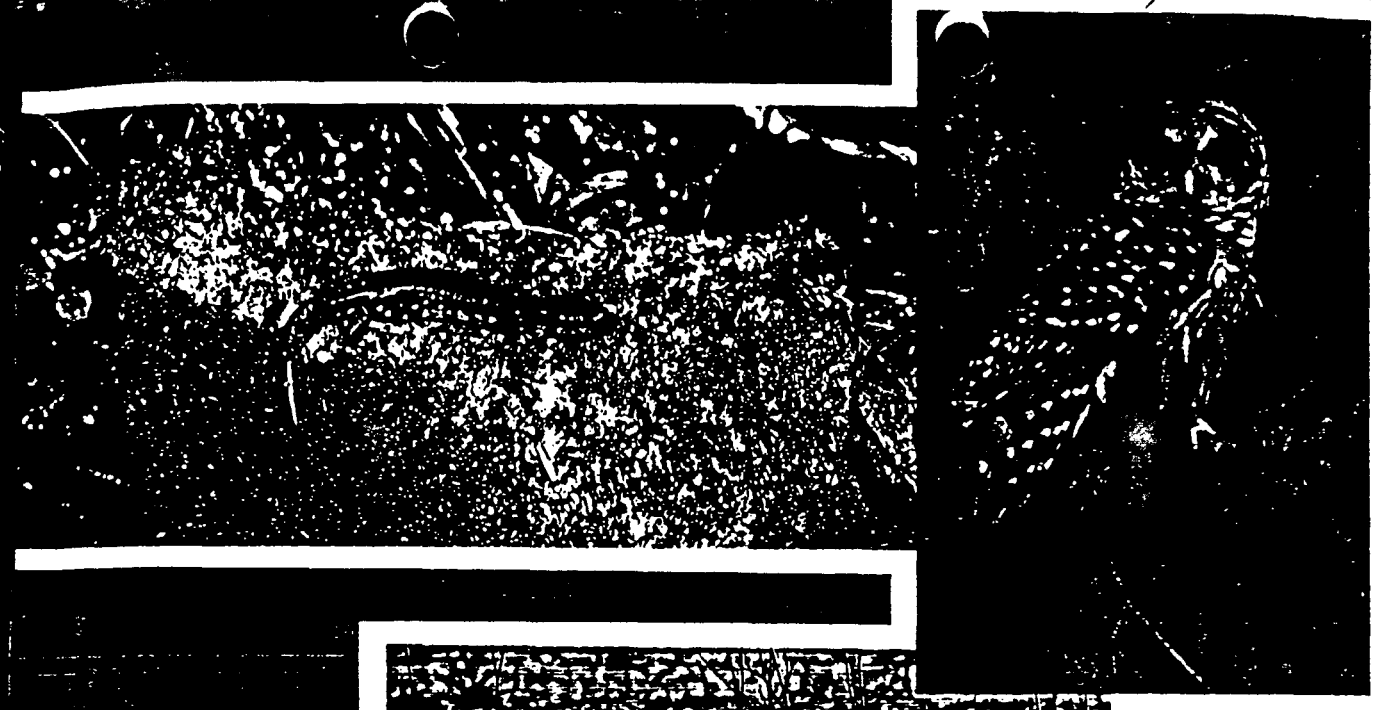
SUMMARY AND CONCLUSIONS

The Coastal Plain of New Jersey is a seaward-dipping wedge of unconsolidated sediments that range in age from Cretaceous to Quaternary. These sediments are composed of clay, silt, sand, and gravel and include continental, coastal, and marine-type deposits.

Hydrogeologic units described in this report can differ from formal stratigraphic units because a geologic formation can contain more than one aquifer, a formation may function as an aquifer in one area and as a confining bed in another, or an aquifer or confining bed may be composed of several geologic formations.

The occurrence and configuration of 15 regional hydrogeologic units have been defined within the Coastal Plain of New Jersey based on the interpretation of borehole geophysics data. Structure-contour maps and aquifer thickness maps are provided for nine aquifers listed in ascending order:

1. Lower aquifer of the Potomac-Raritan-Magothy aquifer system
2. Middle aquifer of the Potomac-Raritan-Magothy aquifer system
3. Upper aquifer of the Potomac-Raritan-Magothy aquifer system
4. Englishtown aquifer system
5. Wenonah-Mount Laurel aquifer
6. Vincentown aquifer
7. Piney Point aquifer



endangered & threatened species of new jersey

USDA, Soil Conservation Service – Somerset, N.J.
N.J. Department o
and Wildlife

ATTACHMENT E

BOG TURTLE

Clemmys muhlenbergi

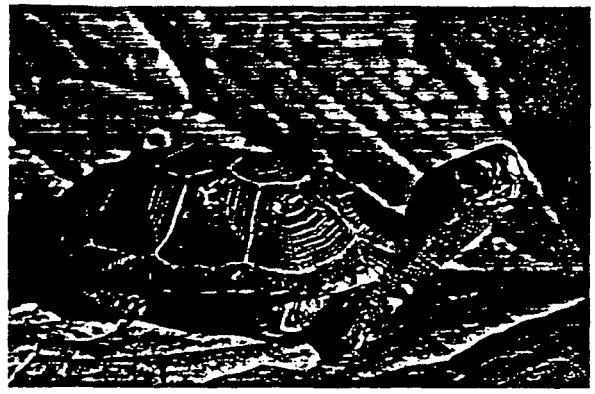
Distinguishing Characteristics: The smallest native North American turtle, the bog turtle ranges in size from 3 to 3½ inches (8 to 9 cm). Its slightly keeled carapace varies in color from a light brown to black. The turtle's limbs and fleshy parts are usually brown and may be flecked with red-orange. The most distinguishing characteristic, however, is the large orange or yellow patches on both sides of the head.

Distribution and Habitat: The secretive bog turtle occurs in disjunct populations of highly specialized habitat. Open sphagnum bogs, swamps, and marshy meadows having clear, slow-moving streams with soft muddy bottoms serve as optimal habitats. Sedge tussocks, skunk cabbage, cattail, jewelweed, and smartweed are common flora of bog turtle habitats. Throughout its range, from southern Massachusetts to Southwestern North Carolina, this species is considered rare. One of the largest concentrations of the turtle is found in New Jersey, specifically in the coastal plain county of Monmouth, and the noncoastal, Warren, Sussex, Morris, Passaic, and Union Counties.

R. Zappalorti

Marshy meadows serve as optimal bog turtle habitat.

Status: Endangered (State). These turtles were probably never numerous; few eggs are laid and juveniles are subject to high mortality. Man's activities have been reclaiming bog turtle habitat for agriculture and urban development and these environmental alterations disrupt the bog turtle's precise semiaquattic requirements. Such alterations include the raising or lowering of the water table within the habitat because of mosquito control and agricultural drainage ditches, construction of roadways, and water impoundments.

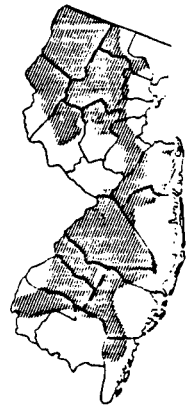


Bog Turtle R. Zappalorti

Management Techniques and Protective Measures: The bog turtle is protected in New Jersey by its state endangered status. Field surveys are most productive when conducted at times of low vegetative growth. Studies of the known and suspected habitats suggest that all these areas be protected. Bog turtles disappear in an area when the muddy substrate and associated flora are replaced by hardwood trees such as red maples. The result of this natural succession suggests habitat management by harvesting of some of these trees to keep an open canopy.

Recommendations: Projects possibly affecting water levels in bog turtle habitat areas must be carefully considered. Pure unpolluted water is critical for the species' survival in natural bogs and marshes, so wetland ecosystems should be preserved in a healthy state. Because the turtle's habitat is so dependent upon a naturally succeeding environment, normal distribution corridors along effluent streams must be kept open rather than blocked by highways and other construction.

Bog turtle colonies occur in small disjunct populations within the breeding ranges.



ADM-012

MEMO

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

TO FILE

FROM FRANK FARANCA, HSMS IV, BUREAU OF PLANNING AND ASSESSMENT 4-13-87

SUBJECT MONROE TWP MUNICIPAL WELL #4 & #5

On 4-9-87 and 4-13-87 the writer conducted a site reconnaissance of Monroe Township Municipal Wells #4 & #5.

The writer met with Mr. George Cassabone, Supervisor of Monroe Twp. Municipal Utilities Authority on 4-9-87. Mr. Cassabone and the writer conducted a windshield survey of Wells #4 & #5, of which #4 is not currently in use. He explained that Monroe Township M.U.A. currently has 4670 services and the current population is 26,000 people.

On 4-13-87 the writer investigated several areas within Williamstown as possible sources contributing to the present mercury contamination of the ground water. Two sites are believed to be suspect for further investigation.

1. The Atlantic City Electric Company - Williamstown Substation
   This parcel of land is located adjacent to Clayton Road (Franklinville - Williamstown Road) on Block 13301, Lot 14. The owner is located at P.O. Box 1500, Pleasantville, NJ 08232. The site is 2.06 acres and contains several rows of oil circuit breakers, transformers and a capacitor bank. The soil within the substation is void of all vegetation and appears stained in several areas.

2. The Gravel Pit
   This parcel of land is also located adjacent to Clayton Road on Block 13301, Lot 11 & 12. The owner is Thomas H. Webb Jr., Rd 7, Box 175, Jackson Road, Williamstown. This site is approximately 10.24 acres which is an inactive gravel pit. The pit itself has had unauthorized dumping of assorted solid waste over many years. A large portion of the gravel pit is devoid of vegetation, and is currently used by the neighbors for the use of recreational all - terrain vehicles. The solid waste is mostly old concrete, asphalt, soil, landscape debris and household trash.

These two sites were in operation prior to the detection of mercury in Well #4 in 1976. An analysis of the USGS Topographic Series Maps reveal that these sites are prime canidates as sources of contamination based upon the hydraulic movement of surface water and ground water to down gradient Wells #4 & #5.

Also suspect is the land on which the Williamstown High School is now located. In the past Mr. Frank Simei owned the land and used it as a farm for spinach and lettuce. However, the use of mercury as a fungicide is not usually associated with these two food crops.

FF:mz

ATTACHMENT F

ADM-012

MEMO

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

TO FILE

FROM FRANK FARANCA. HSMS IV. BUREAU OF PLANNING AND ASSESSMENT DATE 4/7/88

SUBJECT TELECON W/MONROE TWP., M.V.A. SUPERINTENDENT

On 3/29/88 the writer held a telephone conversation with George Cassabone. Water Superintendent of Monroe Township Municipal Utilities Authority. Mr. Cassabone explained that the current population in Monroe Township is 28,000 people. the township size is 51 square miles. and the number of M.U.A services are 4800.

FF:mz

ATTACHMENT G

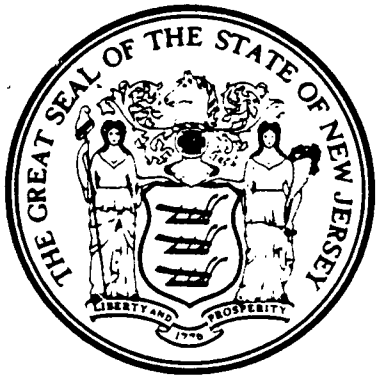
FRANK FARANCA

Flared End Notices — p 6 - p 13

TECHNICAL MANUAL

FOR

STREAM ENCROACHMENT



AUGUST, 1984

Prepared by:

Bureau of Flood Plain Management

ATTACHMENT H

APPENDIX E

CLASSIFICATION OF NEW JERSEY WATERS AS RELATED TO THEIR USE BY ANADROMOUS FISH

Prepared by the Bureau of Freshwater Fisheries
Division of Fish, Game and Wildlife
Department of Environmental Protection

APRIL 1984

ATTACHMENT H

Waterway	Species	Map Ref. No.
Doughty Creek, Atlantic Ocean Drainage, Atlantic County	herring (C)	68
English Creek, Great Egg Harbor Drainage, Atlantic County	herring (R)	
Fenwick Creek, Salem River Drainage, Salem County	herring (C)	25
Fiddlers Creek, Delaware River Drainage, Mercer County	herring (C)	3
Flat Creek, Tuckahoe River Drainage, Cape May County	herring (C)	53
Forked River, Ocean County	herring (R)	
Fresh Creek, Barnegat Bay Drainage, Ocean County	herring (C)	82
Gibson Creek, Great Egg Harbor Drainage	herring (C)	60
Gravelly Run, Great Egg Harbor Drainage	herring (C)	64
Great Egg Harbor River	**herring (C)** A. shad (E)	66
Green Creek	A. shad (E)	
Greenies Sandwash, Maurice River Drainage	herring (C)	42
Gunning River, Barnegat Bay Drainage, Ocean County	herring (C)	83
Hackensack River	herring (C) A. shad (E)	132
Halfway Creek, Tuckahoe River Drainage	herring (R)	
Hammonton Creek, Mullica River Drainage	herring (C)	76
Hankins Brook, Maurice River Drainage	herring (C)	43
Hawkins Creek, Great Egg Harbor Drainage	herring (C)	
Haystack Brook, Metedeconk River Drainage	herring (R)	

MONROE TWP MUNICIPAL WELLS #4 & #5
MONROE TWP/GLOUCESTER COUNTY
NEW JERSEY
EPA # NJD980769699

The Monroe Township Municipal Wells #4 & #5 are located respectively on Washington Avenue and Chestnut Street, Williamstown, Gloucester County. These wells have an intervening distance of 1200 feet and are owned and operated by the Monroe Township Municipal Utilities Authority (MTMUA).

A program for sampling raw water sources throughout the state revealed mercury contamination in Monroe Municipal Wells #4 & #5 on June 21, 1976. The levels of mercury that were in the municipal water system were as high as 10.8 ppb. This level is far in excess of the maximum contaminant level for total mercury of 2.0 ppb promulgated by the USEPA pursuant to the Safe Drinking Water Act.

These wells are underlain by the Quarternary Bridgeton Formation which is characterized by gravel and sand in part solidified by iron oxide. The water bearing unit in which Well #4 & #5 are located is the Cohansey Aquifer. The depth of Well #4 and #5 are 106 and 160 feet respectively. There are also two surface water swails leading to the Squankum Branch and the Hospitality Branch of Great Egg Harbor River.

The sampling and analysis of an individual domestic well owned by the Monroe Township Board of Education revealed total mercury as high as 3.6 ppb on July 17, 1986. This well is located in a maintenance building adjacent to the Williamstown High School on Clayton Avenue in Williamstown. This well is also located at the South-West limit of the MTMUA water supply system.

Immediately after the discovery of mercury contamination in the public water system, Well #4 was taken out of service and was retained only for emergency situations. Well #5 was kept in service because levels of mercury experienced at this well were at or slightly below the maximum contaminant level. Since that time the level of mercury has steadily decreased in both wells.

At present it is not known conclusively where the source of the contamination is located. However, there are two potential sources. The first potential source is the Williamstown Substation of the Atlantic City Electric Company. This site is located adjacent to the high school property on Clayton Road. the second, and more probable source of contamination is an inactive gravel pit also located on Clayton Road. This site has had unauthorized dumping of assorted solid waste over many years since its closure.

ATTACHMENT I

It is recommended that this site be referred to NJDEP/Division of Water Resources for a comprehensive sampling and analysis of the ground water in Williamstown. This will provide additional information to determine the extent and source of the contamination. All environmental sampling undertaken by the NJDEP should be closely coordinated and integrated with the Glouester County Health Department which is also aware of this problem.

Submitted by:

Frank Faranca

Frank Faranca, HSMS IV
NJDEP/DHWM/BPA
MSCA Project

Hours worked: 47

FF:mz

Preliminary Assessment

Monroe Township Municipal Wells #4 & #5

#4 - Washington Avenue

#5 - Chestnut & Water Streets

Monroe Township/Gloucester County

New Jersey

EPA #NJD980769699

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D980769699

II. SITE NAME AND LOCATION

01 SITE NAME	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Monroe Township Municipal Wells #4 & #5	Washington Ave; Chestnut & Water St.

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Monroe Township	NJ	08094	Gloucester	08	

09 COORDINATES LATITUDE	LONGITUDE	
39 38 55	75 03 40	Well #4: Block 3202, Lot 17 Well #5: Block 11602, Lot 2

10 DIRECTIONS TO SITE (Starting from nearest public road)
From Trenton, take Route 295 South to Route #42. Follow Route #42 South to Williamstown.

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)			
Monroe Twp. M.U.A.	372 South Main Street			
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 TELEPHONE NUMBER**	
Williamstown	NJ	08094	(609) 629-7586	George Cassabone
07 OPERATOR (If known and different from owner)	**08 STREET (Business, mailing, residential)**			
09 CITY	**10 STATE**	**11 ZIP CODE**	**12 TELEPHONE NUMBER**	
			( )	

13 TYPE OF OWNERSHIP (Check one)
☐ A. PRIVATE ☐ B. FEDERAL: _____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☒ E. MUNICIPAL
☐ F. OTHER: _____ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)
☐ A. RCRA 3001 DATE RECEIVED: ___/___/___ (Month Day Year) ☒ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: ___/___/___ (Month Day Year) ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION
☒ YES ☐ NO DATE 2 / 8 / 77 (Month Day Year)

BY (Check all that apply)
☐ A. EPA ☐ B. EPA CONTRACTOR ☒ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: _____ (Specify)
CONTRACTOR NAME(S): _____

02 SITE STATUS (Check one)
☒ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION
1951 (Beginning Year) | 1976 (Ending Year) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
Inorganic mercury

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION
Inorganic mercury was detected in public supply wells #4 and #5 as high as 6.4 ppb on 7/19/76. Mercury wes also detected in a potable well at the limit of the Monroe MUA Public Water Supply System.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)
☐ A. HIGH (Inspection required promptly) ☒ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed; complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)			03 TELEPHONE NUMBER
George Cassabone, Superintendent	Monroe Twp. M.U.A.			(609) 629-7586
04 PERSON RESPONSIBLE FOR ASSESSMENT	**05 AGENCY**	**06 ORGANIZATION**	**07 TELEPHONE NUMBER**	**08 DATE**
Frank Faranca, HSMS IV	NJDEP	DHWM/BPA	(609) 633-2219	04 / 14 / 87 (Month Day Year)

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D980769699

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

☐ A. SOLID ☐ E. SLURRY
☐ B. POWDER, FINES ☐ F. LIQUID
☐ C. SLUDGE ☐ G. GAS
☐ D. OTHER _____ (Specify)

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS _____
CUBIC YARDS _____
NO. OF DRUMS Unknown

03 WASTE CHARACTERISTICS (Check all that apply)

☐ A. TOXIC ☐ E. SOLUBLE ☐ I. HIGHLY VOLATILE
☐ B. CORROSIVE ☐ F. INFECTIOUS ☐ J. EXPLOSIVE
☐ C. RADIOACTIVE ☐ G. FLAMMABLE ☐ K. REACTIVE
☐ D. PERSISTENT ☐ H. IGNITABLE ☐ L. INCOMPATIBLE
☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			Mercury was detected in the
ACD	ACIDS			water system as high as 10.8 ppb
BAS	BASES			
MES	HEAVY METALS	Unknown		

IV. HAZARDOUS SUBSTANCES (See Appendix for most commonly used CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
MES	Mercury	7439-97-6	Unknown	10.8	PPB

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sampling analysis reports.)

See reference sheet for list of attachments.

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NJ	D980769699

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [X] A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 8254
02 [X] OBSERVED (DATE 7-19-76) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

Public supply wells #4 and #5 were sampled in 1976 and mercury was detected as high as 6.4 ppb. More recently, a potable well was found to contain 3.6 ppb on 7/17/86.

Attachment B3, B6 and C

01 [X] B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE _____) [X] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

Surface and subsurface discharge may have contributed to surface water contamination of the Squankum Branch and the Hospitality Branch of the Great Egg Harbor River.

Map 1

01 [ ] C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

No potential exists for the mercury in the ground water to contaminate the air.

01 [ ] D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

No potential exists for the fire/explosive conditions due to the nature of the contaminant.

[illegible]
03 POPULATION POTENTIALLY AFFECTED _____
[illegible] [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

No potential exists for direct contact with the mercury contaminated ground water.

01 [X] F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: _____ (Acres)
02 [ ] OBSERVED (DATE: _____) [X] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

A potential for soil contamination exists due to the documented mercury contamination found in the ground water.

Attachment B & C

01 [X] G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 [X] OBSERVED (DATE 7-19-76) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

Public supply wells #4 and #5 were sampled and analysis revealed inorganic mercury in excess of the safe drinking water standards. Well #4 is currently not in use.

Attachment B1-B6

01 [X] H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE _____) [X] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

A potential exists for worker exposure/injury because well #4 is utilized in emergency situations.

Attachment B, C

01 [X] I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: 8254
02 [ ] OBSERVED (DATE _____) [X] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

Approximately 32% of Monroe Township is not on public water supply or 8254 people.

Attachment H

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: NJ | 02 SITE NUMBER: D980769699

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 [X] J. DAMAGE TO FLORA — 02 [ ] OBSERVED (DATE: _____) — [X] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
Surface water drainage and ground water discharge may potentially impact aquatic and terrestrial flora with mercury contamination.
Map 1

01 [X] K. DAMAGE TO FAUNA — 02 [ ] OBSERVED (DATE: _____) — [X] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION (Include names(s) of species)
Surface water drainage and ground water discharge may potentially impact aquatic and terrestrial fauna with mercury contamination.
Map 1

01 [X] L. CONTAMINATION OF FOOD CHAIN — 02 [ ] OBSERVED (DATE: _____) — [X] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
The mode of action of mercury in organisms is that it is Lipid soluable thus making it a potential agent for contaminating the food chain.
Attachment G

01 [X] M. UNSTABLE CONTAINMENT OF WASTES (Spills/runoff/standing liquids/leaking drums) — 02 [ ] OBSERVED (DATE: _____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION
A potential exists for unstable mercury waste to be contaminating the ground water.
Attachment B & C

01 [X] N. DAMAGE TO OFFSITE PROPERTY — 02 [ ] OBSERVED (DATE: _____) — [X] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
Analysis of a potable well owned by the Monroe Twp. Board of Education in July 1986 revealed mercury at 3.6 ppb which is in excess of the maximum contaminant level for safe drinking water.
Attachment C

01 [ ] O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 [ ] OBSERVED (DATE: _____) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
Sampling and analysis of standing water in a storm sewer culvert which accepts well #4 overflow revealed mercury below detectable limits.
Attachment B-30

01 [X] P. ILLEGAL/UNAUTHORIZED DUMPING — 02 [ ] OBSERVED (DATE: _____) — [X] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
A potential exists for unauthorized dumping of mercury waste to be contributing to the present ground water contamination.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS
Approximately 8254 people are not hooked up to the Municipal Water Supply and are at risk of being exposed to the contaminated ground water through the use of their domestic wells.

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS
Sampling and analysis of potable water from the surrounding homes along Clayton and Janvier Roads is recommended.

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)
See reference sheet for list of attachments.

Let's protect our earth

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF HAZARDOUS WASTE MANAGEMENT
John J. Trela, Ph.D., Acting Director
CN 028
Trenton, N.J. 08625
609 - 292 - 1250

APRIL 1987

M E M O R A N D U M

TO: BARKER HAMMILL, CHIEF
BUREAU OF SAFE DRINKING WATER

THROUGH: STEPHEN A. BORGIANINI, CHIEF
BUREAU OF PLANNING AND ASSESSMENT

FROM: FRANK F. FARANCA, HSMS IV
BUREAU OF PLANNING AND ASSESSMENT F.F.

SUBJECT: MONROE TOWNSHIP MUNICIPAL WELLS

The Monroe Township Municipal Wells #4 & #5 are located in Monroe Township, Gloucester County, New Jersey. A Preliminary Assessment was prepared for this site pursuant to the Comprehensive Environmental Response Compensation and Liability Act. This report has revealed that a potential exists for mercury contamination in residential drinking wells outside of the public water supply system. A copy of this assessment is being sent to you to apprise you of the situation. If I can be of any assistance, please feel free to call me at 633-2219. Thank you for your attention in this matter.

FF:mz